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SMITHSONIAN INSTITUTION
UNITED STATES NATIONAL MUSEUM
Bulletin 143

BIOLOGICAL AND TAXONOMIC INVESTIGATIONS ON THE MUTILLID WASPS

BY

CLARENCE E. MICKEL
Of the University of Minnesota

SMITHSONIAN INSTITUTION
277912
U. S. NATIONAL MUSEUM

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The *Proceedings*, begun in 1878, is intended primarily as a medium for the publication of original papers, based on the collections of the National Museum, that set forth newly acquired facts in biology, anthropology, and geology, with descriptions of new forms and revisions of limited groups. Copies of each paper, in pamphlet form, are distributed as published to libraries and scientific organizations and to specialists and others interested in the different subjects. The dates at which these separate papers are published are recorded in the table of contents of each of the volumes.

The *Bulletin*, the first of which was issued in 1875, consists of a series of separate publications comprising monographs of large zoological groups and other general systematic treatises (occasionally in several volumes), faunal works, reports of expeditions, catalogues of type-specimens, special collections, and other material of similar nature. The majority of the volumes are octavo in size, but a quarto size has been adopted in a few instances in which large plates were regarded as indispensable. In the *Bulletin* series appear volumes under the heading *Contributions from the United States National Herbarium*, in octavo form, published by the National Museum since 1902, which contain papers relating to the botanical collections of the Museum.

The present work forms No. 143 of the *Bulletin* series.

Alexander Wetmore,
Assistant Secretary, Smithsonian Institution.

Washington, D. C., *March 10, 1928.*

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INTRODUCTION

A number of years ago at the suggestion of Profs. Lawrence Bruner and Myron H. Swenk I undertook to determine the material in the family Mutillidae at the University of Nebraska. I had not progressed very far with that work before it was evident that the existing literature was inadequate for the identification of many of the species and that the North American Mutillidae presented a rich and interesting field for study. My interest was further aroused when I found upon examination of the genitalia of the males that these structures might be of considerable aid in the classification and identification of the males. When I succeeded in identifying five or six different species of male *Dasymutilla* from a series which had been considered as one variable species by previous workers considerable doubt arose in my mind as to whether the statements in the literature regarding the great amount of individual variation existing in this family were true. So I began the study, which has outgrown my original plan and which has resulted in the paper presented herewith. The conviction that the biology of insects is as much a factor in their taxonomy and phylogeny as morphology led me to assemble all the knowledge regarding their biology and to carry on some minor researches of my own, both of which are included in part 1. In accomplishing this I have examined practically all of the 630 entries listed in the bibliography, most of them in the original. At the suggestion of Mr. S. A. Rohwer, I undertook a study of the genotypes of the family, and the results of that study are found in part 2. I believe that a taxonomic study to be at all complete, should be based on a quantitative study, and I therefore assembled approximately 10,000 specimens of the genus *Dasymutilla* for the basis of the work presented in part 3. Through the hearty cooperation of many individuals, acknowledged below, the material in almost all the important insect collections of the United States and Canada has been included in the study.

In this part of the work I have included keys for the identification of the males and females, a complete bibliographic history of each species, information regarding the location of the type specimens of each species, a summary of the geographic distribution of each species which in the case of the commoner species includes an outline map illustrating this, a complete record of the locality, date, and collector on each specimen, and notes regarding the salient characters by which each species has been identified. The locality and date records are arranged under each species alphabetically by States and should prove useful to those compiling State lists and State records of insects as well as to students of geographic distribution. Each specimen involved in the study has been examined individually under a binocular microscope, and each bears an identification label. In almost all cases the genitalia of the male have been removed and mounted on a paper point just beneath the specimen itself. Part 4 is the bibliography which has been prepared during the course of the work and which it is believed is practically complete.

It is too much to expect that the work is entirely free from errors, but I have spared no pains to reduce their number to a minimum.

The work could not have been completed, in fact it could not have been undertaken at all, were it not for the cooperation and assistance which I have received from many individuals and institutions during the course of the study. While at the University of Nebraska I was privileged to receive the suggestions, encouragement, and advice of Profs. Lawrence Bruner, Myron H. Swenk, and R. W. Dawson. I am most indebted to Dr. R. N. Chapman, Dr. William A. Riley, Dr. H. H. Knight, Prof. A. G. Ruggles, and Dr. O. W. Oestlund for the opportunities, encouragements, helpful criticisms, and inspiration which I have received at the University of Minnesota. Without their cooperation nothing could have been accomplished. The Elizabeth Thompson Science Fund, Dr. E. B. Wilson, chairman, made it possible for me to examine the type specimens of nearly all the species of *Dasymutilla* by granting $275 for travel expenses for that purpose. With the aid of this fund I was able to study the type specimens deposited in the collections of the United States National Museum, Washington, D. C.; the American Entomological Society, Philadelphia; the American Museum of Natural History, New York City; the Museum of Comparative Zoölogy, Cambridge, Mass.; and of Abbé Provancher, Quebec, Canada. This study enabled me to clear up many problems that could not otherwise have been solved. I have received encouragement and suggestions from Mr. S. A. Rohwer, chief of the division of taxonomic investigations, United States Bureau of Entomology, throughout the course of the work; his cooperation has been invaluable.

I am indebted to Miss Harriet Sewall, librarian of the University of Minnesota department of agriculture, and Miss L. Mae Centerwall, her assistant, for the opportunity of seeing many of the papers listed in the bibliography. I am especially indebted to Dr. Walther Horn, Berlin, Germany, for his active interest in obtaining a loan of Fabricius's specimens of *Mutilla ferrugata* for me from the authorities of the Kiel Museum. He was also kind enough to secure and send me a transcript of Scholz's paper entitled "Bienenfeinde." Dr. R. N. Chapman, chief of the division of entomology, University of Minnesota, is responsible for securing the aid of Miss Margaret Fulleylove, who has sent me transcripts of a number of papers from the entomological libraries of England.

Dr. J. Chester Bradley generously turned over to me the valuable collection of *Dasymutilla* at Cornell University, together with notes on a number of new species. Dr. A. L. Melander was kind enough to loan me the types of species described by him.

The following persons and institutions have assisted me by the loan of material: Mr. S. A. Rohwer, United States National Museum; Dr. F. E. Lutz, American Museum of Natural History; Dr. Nathan Banks, Museum of Comparative Zoology; Dr. Henry Skinner and Mr. E. T. Cresson, jr., American Entomological Society; Dr. J. McDunnough and Mr. C. Howard Curran, Canadian Department of Agriculture; Dr. J. C. Bradley, Cornell University; Prof. S. J. Hunter and Dr. H. B. Hungerford, University of Kansas; Prof. Myron H. Swenk, University of Nebraska; Prof. F. M. Gaige, University of Michigan; Prof. J. J. Davis, Purdue University; Dr. H. H. Knight, Iowa State College; Prof. George A. Dean, Kansas State Agricultural College; Dr. C. P. Gillette, Colorado State Agricultural College; Dr. Paul Gilmer, New Mexico State Agricultural College; Prof. T. D. A. Cockerell, University of Colorado; H. A. Scullen, Oregon Agricultural College; Prof. J. R. Parker, Montana Agricultural College; Prof. H. J. Reinhard, Texas Agricultural Experiment Station; Prof. M. R. Smith, Mississippi Agricultural and Mechanical College; Dr. H. P. Severin, South Dakota Agricultural College; Mr. J. G. Sanders, Pennsylvania Department of Agriculture; Mr. H. S. Smith, California State insectary; Mr. D. C. Mote, State entomologist of Arizona; Prof. G. M. Bentley, Tennessee Agricultural College; Clemson College, South Carolina; Utah Agricultural College; North Carolina Department of Agriculture; Leland Stanford University; Prof. H. F. Wickham; Dr. J. Bequaert; Mr. W. E. Hoffmann; Prof. O. A. Stevens; Mr. C. N. Ainslie; Mr. A. A. Nichol; Mr. G. W. Goldsmith; Mr. W. Knaus; Dr. E. G. Anderson; Mr. Arthur Harris, jr.; Mr. L. S. Slevin; Mr. G. H. Knowlton; Mr. A. C. Burrill; and Dr. Paul Y. Babiy.

To all of these who have assisted me I wish to express my gratitude and thankful appreciation.

CLARENCE E. MICKEL.

ST. PAUL, MINNESOTA, *December 3, 1926.*

BIOLOGICAL AND TAXONOMIC INVESTIGATIONS ON THE MUTILLID WASPS

By Clarence E. Mickel

Of the University of Minnesota

PART 1

BIOLOGY OF THE MUTILLID WASPS

When Linnaeus published the tenth edition of Systema Naturae in 1758, he included eight species in his genus *Mutilla*. Two of these species were later shown to belong to the Ichneumonidae. Two of the six remaining species were known before the publication of this work. Petiver had figured the female of *occidentalis* from North America as early as 1703, and Uddmann had figured the female of *europaea* in 1753, giving it the name of "Apis aptera." The Mutillids were regarded as social insects during most of the eighteenth century, principally on account of the similarity of appearance between them and the ants, which were known to be social, and because of the lack of any empirical data on the subject.

Hundreds of new species of Mutillids were discovered during the latter half of the eighteenth, the nineteenth, and the first part of the twentieth centuries by Fabricius, Olivier, Lucas, Burmeister, Gerstaecker, Radoszkowski, André, Cameron, Bingham, and Bischoff in Europe, Peringuey in Africa, and by Cresson, Blake, and Fox in the United States. It is estimated that 3,500 to 4,000 species have now been described, the great majority of them in the single genus *Mutilla*. Practically nothing was done to subdivide this great mass of species, and to recognize genera with narrower limits until the beginning of the twentieth century, although Blake (1871) and Radoszkowski (1885) made an attempt in this direction, only to have their work disregarded and the species returned to the genus *Mutilla* by later workers. Ashmead (1899, 1903) and André (1903*a*) were the first to attempt a general classification of the family and proposed many new genera. Bischoff (1920) also proposed many new genera in his treatment of the African species of Mutillidae. The genera which have been proposed up to the present time number about 100.

The classifications that have thus far been proposed for the Mutillidae have had a purely morphological basis, and the problem has been approached by most workers with the idea that the family is an exceedingly variable group. Recent study has shown that in the case of many American species, at least, this idea has originated from the fact that series of specimens in collections supposed to represent a single species were really composite and represented two or more species. Even from the strictly morphological viewpoint many valuable structural characters which have specific and possibly generic or higher value have been completely overlooked. The classification and phylogeny of the Mutillidae is still very obscure, due to the fact that the morphological basis on which the former has been erected is very incomplete, and also to the fact that morphology alone is too inadequate a basis for a natural classification.

A true phylogeny of any group of organisms represents the relationships of the component parts of the groups and also represents the course of evolution during their development in geologic time. The relationships of groups of organisms as they have actually existed during the course of evolution can only be completely understood when all the facts regarding them are available, and the phylogeny representing all these developments may be referred to as the "ideal phylogeny." The nearer a classification of a group of organisms can approach to expressing this ideal phylogeny, the more natural it will be, and the nearer it will come to expressing true relationships.

The factors of phylogeny are morphology, physiology, ontogeny, and ecology. All of these factors have expressed themselves in all organisms and the ideal phylogeny is the sum of this expression. A classification based on morphology alone is then obviously incomplete since it ignores the facts of physiology, ontogeny, and ecology. In other words, the biological data which will reveal some knowledge regarding the relationships of the organisms in question have been neglected.

As mentioned above, the classifications of the Mutillidae so far proposed have been based almost entirely on morphological grounds. This is not surprising in view of the fact that comparatively little is known regarding the biology of the family as a whole and the knowledge that we do possess is widely scattered through the literature and more or less inaccessible. In order to overcome the latter difficulty the writer has attempted to bring together in the following pages all the facts available regarding the biology of this interesting family of wasps. It is believed that a summary of this sort will not only serve to stimulate further investigation of the group, but will also be of some material aid in any phylogenetic study of the family that may be undertaken.

EARLY SUPPOSITIONS REGARDING THE HABITS OF MUTILLIDS

The first account of the habits of the Mutillids is that of Barbut (1781), who wrote regarding *Mutilla europaea* Linnaeus as follows:

> These beautiful insects are inhabitants of the ground, and to be met with under the moss, more especially when there is a hollow space between the moss and the earth. Walking in Hyde Park the latter end of the summer in pursuit of insects, upon turning up the moss, I had the pleasure of seeing a most beautiful company of these animals. Their wings, which shone like pearl, were laid horizontally on their back, and but few of them being alatae, gave the group a splendid appearance. They were so swift in motion that I could not catch any more than one. I believe there might be 20 together, which convinces me they live in society similar to that of ants.

Thus the idea that the Mutillids were social insects gained credence very early.

The earliest important observations on the Mutillids are those of J. L. Christ (1791). Christ regarded these wasps as wild bees and discovered that a relationship existed between *M. europaea* and bumblebees, but interpreted it as being commensal. A translation of the account of his observations is as follows:

> First I must mention that all the Mutillid nests I have been able to find have contained bumblebees. I have, in part, found Mutillid families in which bumblebees lived, in part, bumblebee families in which the Mutillids lived. In the first, the Mutillids formed approximately five parts and the bumblebees one part; but in the latter the bumblebees amounted to approximately six parts and the Mutillids one part. In each of these combined dissimilar societies there were males, females, and young of each species in the nest. The young of both the bumblebee and the Mutillid were found together in the cells, like children of one family, so that I was much pleased with this brotherly harmony in two so different appearing species of insects, and I would have liked to have given them the name of Damon and Pythias, if they had not already been named by Linné.

The idea that the Mutillids were social insects was rather firmly established by those observations and it was not until many years later that the true relationship between bumblebees and *M. europaea* was discovered. It is remarkable that, with the observations of Christ to be used as a foundation, the true relationship existing between the bumblebee and *M. europaea* was not learned very soon afterwards. However, it was more than 50 years before any additional facts were discovered.

Latreille (1792*a*) wrote that he did not believe the Mutillids to be social insects, but his later writings do not indicate that he was ever able to show that they were not. E. Sibly (1802?) in a popular work on natural history restates the observation made by Barbut. Fabricius (1804) quotes Christ in regard to the habits of the Mutillidae. Jurine (1807) apparently did not know of Christ's work and in his account of the Mutillids says practically nothing regarding their habits. He was uncertain as to whether the individuals consisted of only males and females, or whether workers were also present as in the social insects.

Champion (1836) was the first to suggest that the Mutillids were parasites of other wasps and bees. He gives his reasons for such a conclusion, as follows: "I have frequently seen the females enter the nests of Andrenidae, and occasionally those of *Cerceris.* I also once caught a female climbing the trunk of *Ulmus campestris*, on which some of the *Eumenes* had formed their clay bottle-shaped nests. Another species I took commonly on the sea sand, in which the *Bembex rostrata* had dug its nests." Shuckard (1837*a*) believed that possibly the larva was fed on Diptera, because "my friend, Mr. Pickering, dug a female out of the ground during the last winter at Coombe wood, and mixed in the sand he had removed he found the wings of flies." This, of course, has never been confirmed, since none of the Mutillids, either in the larval or adult state, are known to feed on adult insects. Nylander (1846) reports that Dahlbom had collected *M. europaea* in the nests of *Bombus rajellus* Kirby, but makes no other comment regarding it, and Dahlbom (1847) himself called attention to this same fact and suggested that the Mutillid was really a parasite.

The various textbooks on entomology of this period and even as late as 1860 quote various of the above-mentioned authors regarding the habits of the Mutillids, but in most of these the suggestions regarding the parasitic rôle of these wasps were ignored.

OBSERVATIONS ESTABLISHING THE PARASITIC RÔLE OF THE MUTILLIDS

Over 50 years after Christ made his observations regarding the relationships of bumblebees and Mutillids, Drewsen (1847) established the fact that this relationship was parasitic. Even Drewsen calls attention to the fact that Christ's statements had been practically neglected during this 50-year period by the entomologists who wrote on the subject of Mutillids. Drewsen collected a nest of the bumblebee *Bombus scrimshiranus* Kirby and took it home for observation. The nest contained over 100 cells, but he obtained only two worker bumblebees from it. In addition to these, however, he reared 44 males and 32 females of *M. europaea* from the nest. He observed that the cells from which he obtained the Mutillids had been closed after the bumblebee larvae were full grown and that, therefore, the former must have destroyed the full-grown bumblebee larva and in its turn have become the occupant of the cell. It was also his opinion that the ovipositor of the Mutillid served as an apparatus to bore through the wall of the cell and either kill or arrest the development of the bumblebee larva.

This was the first step in advance that the biology of the Mutillids had taken since the work of Christ. It clearly established the parasitic relation existing between *M. europaea* and the bumblebees, proved that they were not social insects, and that they did not provision their nests with other insects as in the case of other fossorial wasps.

The hosts of a number of other species of Mutillids were discovered following the work of Drewsen. It was found that the Mutillids were not limited to bumblebees for hosts, but parasitized many other species of bees and wasps.

The observations of Christ, Dahlbom, and Drewsen indicated that *M. europaea* was not limited to any single species of bumblebee as a host, since Christ had observed *Bombus muscorum* Linnaeus, Dahlbom made his observations with *Bombus rajellus* Kirby, and Drewsen's material was that of *Bombus scrimshiranus* Kirby.

Hoffer (1886) carried out many rearing experiments with bumblebee nests and reared *M. europaea* from the nests of 11 different species of *Bombus*. New points in the life history of this wasp observed by Hoffer were as follows:

1. The female Mutillid pierces the wax wall of the cell, paralyzes the *Bombus* larva within with her sting, and then deposits the egg.
2. The egg hatches in three days.
3. When full grown the Mutillid larva spins its own cocoon within the cell of the bumblebee.
4. The length of the pupal stage was estimated at 20 days.

In addition to these he says that he did not observe any hostile action on the part of the bumblebees when Mutillids entered their nest for purposes of oviposition, and that he thought there might be two generations per year of *M. europaea*.

Borries (1892) gives an account of a species of Mutillid which has a species of *Crabro* as a host and thinks it doubtful that the Mutillid female stings and paralyzes its host, since the host larva is full grown and has spun its cocoon before it is parasitized. In contrast to Hoffer's statement that no hostilities were observed between *M. europaea* and the bumblebees is the account of Melander and Brues (1903) in which they describe the combats between *Pseudomethoca canadensis* (Blake) and *Halictus* bees.

The most complete and detailed account of the life history of any Mutillid is that relating to *Mutilla glossinae* Turner, which has been worked out in connection with the investigations on tsetse flies in Africa. This wasp was first reported as a tsetse fly parasite by R. A. F. Eminson (1915) as follows:

> In a batch of 258 collected *Glossina* pupae, from one puparium there emerged, on the 21st of June, 1914, a wingless parasitic wasp of the genus *Mutilla*. It was observed that the wasp on emerging had broken open the puparium in precisely the same way as would the fly itself, so that a mere external examination of the case would not reveal the fact that the fly pupa had been parasitized. On investigating a number of pupa cases collected in the field,

four were found to contain remains of parasitic pupae which were probably referable to the same species of *Mutilla*. On August 21, 84 of the tsetse pupae were still unhatched, and seven of them were therefore opened. Two of these contained larvae of the parasite, and in the other five the fly pupae had died from other causes. From the 77 remaining puparia 2 males and 8 females of the *Mutilla* were bred out between the 2d and 6th of September.

Lamborn (1915) shortly afterwards presented a much more detailed account of this same wasp which is quoted here in its entirety.

> The large number of Mutillid wasps in the Lingadzi district attracted my attention from the first, and I endeavored during my earlier days here to parasatize tsetse pupae with them, but without success. Long series of the smaller species, which seemed suitable, have been sent home.
>
> In late May, however, two Mutillids, a male and a female, which I have since learnt from the Bulletin are *Mutilla glossinae* Turner, were bred out from pupae found in the vicinity of Monkey Bay, and a good series has now been obtained, 6 males and 10 females having been bred out. The tsetses which have emerged from the 1,143 living pupae which I have obtained since April 10 number 54 males and 71 females.
>
> The appearance presented by a pupa case from which a Mutillid parasite has emerged seem to me characteristic and unmistakable, though a contrary opinion has recently been expressed. (Eminson, quoted in Bull. Ent. Res., v, p. 382.) On taking such a case in the fingers there is, owing to the presence of the *Mutilla* cocoon within, a sense of greater solidity than when a fly has emerged, and it is possible by gentle pressure to crumble away the wall of the puparium so as to obtain the cocoon, a light chestnut-colored structure composed of several layers of a very tough silky-looking material. The orifice of exit is usually much smaller and has a serrate edge, instead of the larger clean-cut fracture produced by the emergence of the fly, owing to the parasite having nibbled out a circular cap, and one can always see the walls of the cocoon within. In the course of time the cocoon tends to shrink, the result being that it draws in with it the margin of the hole of exit in the pupa case, so that this is no longer circular but somewhat oval, a condition never seen in the case of a normal puparium.
>
> There has been no difficulty at all in dealing with the Mutillids in captivity, for all, except two, one of which was accidentally drowned, are still alive now, one or two of the earliest specimens being several weeks old. The original male placed in a box with the female shortly after the emergence of the latter manifested the greatest excitement, running about with its antennae on the ground on the trace of the female, which it overtook after a considerable chase and immediately seized, pairing taking place almost at once. It is noteworthy that in the course of the chase it ran repeatedly very near to the female, but being off the fresh track did not detect it, the sense of sight being evidently of very little help to it in the matter.
>
> Various pairs have been kept in captivity in jars containing a number of tsetse pupae buried in earth, in the hope that the females would sooner or later parasitize them. The expectation seems likely to be fulfilled, as on May 30 the first female, which emerged so long ago as the 3d of that month, was actually witnessed ovipositing in one of the pupae. As the manner in which oviposition was effected presented features of interest, I jotted down at the time a full note concerning it, which I now transcribe: At 5.45 p. m., on coming into camp from a day's trek, I removed from inside a box, which had been closed all day, a jar containing the *Mutilla* female, No. 1, and a number of tsetse pupae, mostly buried in earth, though one or two were on the surface.

On the top of one of the latter the *Mutilla* was seen. It remained still a few seconds, then precipitately vanished beneath a lump of earth, as is their habit when alarmed. In a few minutes it came out into the open again cautiously and, after examining with its antennae some pupae near the one on which I had first seen it, started, with its head facing the tail end of the pupa, to whittle away with its jaws at a point midway between the two poles with such energy as to rock it. Its antennae were crossed and below its head. After five minutes' work in the horizontal position it gradually raised itself vertically, with its head down on the pupa, supporting itself against the side of the jar, so that a full view of its movements with a lens could readily be obtained. Extremely fine movements of the jaws in and out took place with great rapidity and with such delicacy that unless one's attention had been attracted by corresponding movements of the labial palpi the operations in progress would have been undetected. From time to time a sharp turn of the head through a quarter of a circle on each side also went on.

After half an hour's work the *Mutilla* retired a short way from the pupa and, resting on its side, cleaned its antennae and rubbed its legs together, but then manifested some uneasiness at the light, for at this point I had to watch it by lamp light, and concealed itself. But when the light was very much shaded it returned to the pupa, put its head to the site of its previous operations, where with a lens I could see a small breach of surface, and then gradually raising the hinder part of its body so as to rest again on its head, recommenced work, its antennae being this time in front of its head, but resting on the pupa. Occasional movements of anteflexion of the abdomen then took place, as if the insect were preparing for oviposition, and finally, after at least an hour's work, the insect resumed the horizontal attitude on the pupa, and having examined its work advanced so that its hinder end came somewhere over the breach. It then moved to and fro, feeling for the exact spot, and then remained still, doubtless in the act of oviposition, running away a few seconds later.

Though the female worked so indefatigably, so tiny a puncture was produced as to be barely visible except in a certain light to the unaided eye, and it appeared moreover as if definitely sealed by the insect with some secretion after oviposition. This may possibly be a very important part of its final operations, as on several occasions I have found an exuberant fungus growth, brown in colour, sprouting at little fissures accidently produced in tsetse pupae. Later I hope to be able to study this further.

I should perhaps add that the night when the *Mutilla* was working was bitterly cold, a rather surprising fact, seeing that as a rule these insects are so lethargic except on bright sunny days.

I have now examined carefully all the pupae to which this female has access, and 7 out of the 20 show this evidence of attack. There is therefore every reason to believe that the *Mutilla* can be raised experimentally in some numbers and without any great difficulty in the laboratory. Their hardiness, their activity in finding food for themselves, and their longevity make them singularly easy to deal with, so that I expect shortly to be able to submit a further report on the subject.

In regard to their general habits, they do not as a rule become active till the middle of the afternoon, remaining until then hidden beneath objects on the top of the ground, or buried beneath the superficial layers of the soil. The female is an adept at burrowing, and the male in pursuit of her does not hesitate to force his way into the soft earth. Both sexes run with extreme activity, the male being unusually loth to take to flight for a winged insect.

The females in captivity soon lose the quality of shyness, which is so marked during the first day or two after emergence, and will then run about unconcernedly, even though one is moving objects in the jar, almost as if they had learnt that they were unlikely to be molested.

Williams (1919) has succeeded in rearing a species of Mutillid from *Tiphia lucida* Ashmead in the Philippine Islands. Since his account adds some details not hitherto described, it is quoted here in full:

> The country about Los Banos abounded in "velvet ants" or Mutillidae—many of small size. As these insects are known to parasitize the cocoons of various solitary bees and wasps, I was able to rear a small, two-spotted species from a bred cocoon of *Tiphia lucida*. On August 30, 1916, I buried seven cocoons, containing the quiescent pale yellowish *Tiphia* larva, in soil in a tumbler and introduced a small *Mutilla* with two white spots on her abdomen. On September 3, I cut open these cocoons and found that two of the quiescent *Tiphia* larvae had been parasitized by *Mutilla*. In the one case the *Tiphia* larva had a *Mutilla* egg transversely arranged on its dorsum between the first and second thoracic segments. The egg was semitransparent whitish, about five times as long as thick, somewhat curved, rather broadly rounded at one end and conical at the other. Under a hand lens its surface showed numerous pointed granulations. The second parasitized *Tiphia* had an active *Mutilla* larva a day or two old on the underside of the body. Like the egg, its skin was also finely roughened. It required about four days to become full fed, consuming all its prey. It failed to spin a perfect cocoon, but remained as a quiescent, dull whitish larva for about eight days before changing into a pupa, which a few days later hatched into a female wasp.
>
> I succeeded in getting several other *Mutilla* ovipositions. One cocoon contained two *Mutilla* eggs. The cocoon's envelope is not visibly perforated by the ovipositor of the parasite.

Ferton (1921) has made some observations on *Stenomutilla argentata* var. *saundersivora* Ferton, which differ in some respects from those already mentioned. The host of this Mutillid is *Osmia saundersi* Vachel. Ferton states that the Mutillid egg in this case is attached to the interior wall of the *Osmia* cocoon. Williams, on the contrary, found the egg attached to the *Tiphia* larva, as stated above. Ferton also observed two Mutillid eggs in one *Osmia* cocoon, but says that one was empty and dry; he does not describe the exact position of the Mutillid larva on its host, but says that it was toward the middle.

Ashmead and Davidson (1897) write: "The eggs of *Sphaerophthalma anthophora* Ashmead are deposited with that of the parent host before the cell is sealed up, and they probably share with the bee larvae the food stored in the cell, and only attack the bee when it is fully grown and which it is seldom able to completely devour." This seems very unlikely, since Mutillid larvae are not known to feed on pollen and honey such as is supplied the larvae of *Anthophora;* and furthermore, in all cases where the life history is known, the adult female Mutillid deposits her eggs through the wall of the cocoon or cell of the host upon the prepupa or pupa of the host. It is further stated by Davidson that the Anthophora cells are also parasitized by *Melecta californica* and that sometimes the latter is attacked by *Sphaerophthalma anthophora* when their cocoon is partially formed. If this is true it would indicate still more forcibly that the female Mutillid deposits her egg through the wall of the *Anthophora* cell, since otherwise the egg would be deposited before the cell was closed and undergo little or no development until the *Anthophora* larva had grown and been destroyed and the *Melecta* larva had become full grown and spun its cocoon. Inasmuch as the Mutillids regarding which data are available only require a few days for development from egg to prepupa, such a state of affairs does not seem probable.

LIFE HISTORY OF METHOCA ICHNEUMONIDES LATREILLE

Methoca ichneumonides Latreille is an insect closely related to the Mutillids, although considered by some authors to belong to a distinct family, Methocidae. Its life history differs considerably from that of the Mutillidae (s. str.). It is possible that its habits and behavior may throw some light on its phylogenetic relation to the Mutillidae. If it is to be considered as a true Mutillid (s. str.), then there is reason to believe that other species of Mutillidae may have similar life histories. Adlerz (1904) mentioned *M. ichneumonides* as a parasite of Cicindelid larvae, and later (1906) gives a detailed life history. In this case the Methoca attacks the larva of a Cicindelid and paralyzes it before laying its eggs. Its behavior in this respect is similar to that of other fossorial Hymenoptera. The egg is laid on the body of the larva near the hind coxae. The egg hatches, and the young *Methoca* larva begins to feed on its host. When the larva is full grown it spins a cocoon in the burrow of the Cicindelid and undergoes the remainder of its transformations within the cocoon. The principle difference between *Methoca* and *Mutilla* is that the former attacks a Coleopterous larva and paralyzes it before laying its egg, while the latter attacks the prepupal and pupal stages of wasps, bees, and some Diptera, depositing its egg within the cocoon or puparium of its host, and apparently without any attempt to paralyze the latter. Bouwman (1909), independently of Adlerz, has made similar observations regarding the life history of this insect.

Pagden (1926) has verified the observations of Adlerz and Bouwman and has succeeded in demonstrating that *Methoca ichneumonides* is probably parthenogenetic. Pagden placed a virgin female of this species in a glass jar of sand where some Cicindelid larvae had burrowed. The *Methoca* attacked the Cicindelid larvae in the usual manner and deposited eggs on several of them. Eight Cicindelid larvae were attacked altogether and from these were procured five cocoons of *Methoca*. At the time of publication the adults had not emerged from the cocoons. Perhaps the phenomenon of parthenogenesis may prove to be more or less common among the mutillids (s. str.).

HOSTS OF THE MUTILLIDAE

The information concerning the hosts of the Mutillidae is scattered through the literature in the form of short notes and is more or less inaccessible. On this account the usual statement of authors regarding the matter is that the Mutillidae are parasites of other wasps and bees. This is, in general, correct, but not universally true and it is believed that a tabulation of the hosts of this family will serve as a basis for further investigation, as well as throw some light on the possible taxonomic relationships existing between various groups of the family, and between the Mutillidae and their near relatives.

In the following table the name of the host is given, together with the name of the species of Mutillid concerned, and the authority responsible for the statement. In cases where the relationship between the Mutillid and the host was considered doubtful by the authority, the latter's name is followed by a question mark.

Name of host	Name of Mutillid	Authority
COLEOPTERA		
Cicindelid larva	*Methoca ichneumonides* Latreille	Adlerz (1906). Bouwman (1909). Pagden (1926).
Clythra tristigma Lacordaire	*Mutilla clythrae* Rosenhauer	Rosenhauer (1856).
Clythra sp. (taken in nest of *Cremastogaster peringueyi* Emery).	*Mutilla thyone* Peringuey	Peringuey (1898).
DIPTERA		
Glossina morsitans Westwood	*Mutilla glossinae* Turner	Eminson (1915).
Glossina morsitans Westwood	*Mutilla benefactrix* Turner	Turner (1916 *b*).
Glossina morsitans Westwood	*Mutilla auxiliaris* Turner	Turner (1920).
HYMENOPTERA		
Tiphia lucida Ashmead	*Mutilla* sp	Williams (1919).
Elis quinquecincta Fabricius	*Dasymutilla quadriguttata* (Say)	Hayes (1924).
Elis quinquecincta Fabricius	*Dasymutilla permista* Mickel	Hayes (1924).
Leptochilus mauritanicus (Lepeletier).	*Stenomutilla argentata* (Villers)	Radoszkowski (1869).
Eumenes esuriens Fabricius	*Mutilla regia* Smith	Cameron (1902 *d*).
Eumenes conica Fabricius	*Mutilla regia* Smith	Dutt (1912).
Eumenes arbustorum Panzer	*Dasylabris maura* Linnaeus (cited as *Mutilla austriaca* (Panzer).	Chretien (1896).
Eumenes sp	*Mutilla yerburghi* Cameron	Dutt (1912).
Eumenes sp	*Mutilla metallica* Cameron	Dutt (1912).
Eumenes sp	*Mutilla poonaensis* Cameron	Dutt (1912).
Polistes sp	*Pycnotilla barbara* var. *brutia* (Petagna).	DeStefani Perez. (1882).
Polistes sp	*Tropidotilla littoralis* (Petagna)	DeStefani Perez. (1882).
Eragethes laboriosus Ferton	*Smicromyrme rufipes* (Fabricius)	André (1899–1903).
Bembix pruinosa Fox	*Dasymutilla bioculata* (Cresson)	Mickel (1924).
Microbembex monodonta (Say)	*Dasymutilla bioculata* (Cresson)	Mickel (1924).
Oxybelus uniglumis Linnaeus	*Myrmosa melanocephala* Fabricius	André (1899–1903).
Crabro (*Solenius*) *rubicola*	*Cystomutilla ruficeps* (Smith) (cited as *M. erythrocephala* Fabricius).	Borries (1892).

Name of host	Name of Mutillid	Authority
HYMENOPTERA—Continued		
Pemphredon wesmaeli Morawitz	*Cystomutilla ruficeps* (Smith)	Ferton (1908).
Tachysphex sp	*Smicromyrme rufipes* (Fabricius)	André (1899-1903).
Larra anathema Rossi	*Smicromyrme viduata* (Pallas)	Sichel and Radoszkowski (1869).
Gorytes sp	*Smicromyrme viduata* (Pallas)	André (1899-1903).
Pelopaeus spirifex (Linnaeus)	*Dolichomutilla guineensis* subsp. *sycorax* (Smith).	Peringuey (1898).
Chalybion caeruleum (Linnaeus)	*Dasymutilla vesta* (Cresson)	Rucker (1903).
Sceliphron coementarium (Drury).	*Sphaerophthalma scaeva* (Blake)	Rau (1922).
Sceliphron madraspanatum (Fabricius).	*Stenomutilla oglana* (Cameron)	Dutt (1912).
Sphex occitanica Lepeletier	*Dasylabris maura* (Linnaeus)	André (1899-1903).
Ammophila heydenii Dahlbom	*Dasylabris maura* (Linnaeus)	Giraud (1863).
Bombus hortorum var. *argillaceus* Scopoli.	*Mutilla europaea* Linnaeus	Hoffer (1886).
Bombus pratorum Linnaeus	*Mutilla europaea* Linnaeus	Hoffer (1886).
Bombus rajellus Kirby	*Mutilla europaea* Linnaeus	Hoffer (1886) and Dahlbom (1847).
Bombus silvarum Linnaeus	*Mutilla europaea* Linnaeus	Hoffer (1886).
Bombus agrorum Fabricius	*Mutilla europaea* Linnaeus	Hoffer (1886).
Bombus agrorum Fabricius	*Mutilla europaea* Linnaeus	Alfken (1914).
Bombus variabilis Schmiedeknecht	*Mutilla europaea* Linnaeus	Hoffer (1886).
Bombus pomorum (Stammforth)	*Mutilla europaea* Linnaeus	Brischke (1862) and Hoffer (1886).
Bombus lapidarius Linnaeus	*Mutilla europaea* Linnaeus	Hoffer (1886).
Bombus mastrucatus Gerstaecker	*Mutilla europaea* Linnaeus	Hoffer (1886).
Bombus confusus Schenck	*Mutilla europaea* Linnaeus	Hoffer (1886).
Bombus terrestris Linnaeus	*Mutilla europaea* Linnaeus	Hoffer (1886).
Bombus apricus	*Mutilla europaea* Linnaeus	Sichel and Radoszkowski (1869).
Bombus muscorum Fabricius	*Mutilla europaea* Linnaeus	Sichel and Radoszkowski (1869) and Smith (1876).
Bombus scrimshiranus Kirby	*Mutilla europaea* Linnaeus	Drewsen (1847).
Anthophora occidentalis Cresson	*Dasymutilla fulvohirta* (Cresson)	Mickel. (See p. 72.)
Anthophora montana Cresson	*Photopsis anthophora* (Ashmead)	Ashmead and Davidson (1897).
Anthophora sp	*Photopsis unicolor* (Cresson)	Davidson (1894).
Ceratina sp	*Mutilla aglaca* Peringuey	Peringuey (1898).
Diadasia sp	*Dasymutilla foxi* (Cockerell)	Mickel. See p. 85.
Dianthidium sp	*Dasymutilla asopus* (Cresson)	Mickel. See p. 61.
Dasypoda plumipes Panzer	*Smicromyrme viduata* (Pallas)	Lichtenstein (1878). ?
Ptilothrix plumata Smith	*Mutilla hoplitiformis* Strand	Strand (1909).
Halictus sp	*Pseudomethoca canadensis* (Blake)	Melander and Brues (1903). ?
Halictus sp	*Myrmilla capitata* (Lucas)	Ferton (1898). ?
Halictus malachurus Kirby	*Myrmilla capitata* (Lucas)	André (1899-1903).
Nomia pattoni Cockerell	*Pseudomethoca sanbornii* (Blake)	Mickel (1924).
Megachile scricans Fonce	*Pycnotilla barbara* var. *brutia* (Petagna).	André (1899-1903). ?
Chalicodoma californica Ashmead	*Photopsis anthophora* (Ashmead)	Ashmead and Davidson (1897).
Chalicodoma muraria Fabricius	*Pycnotilla barbara* var. *brutia* (Petagna) (cited as *M. hungarica*).	Swinton (1878).
Alcidamea producta Cresson	*Photopsis* sp. ?	Davidson (1896).
Osmia tricornis Latreille	*Mutilla quinquemaculata* Cyrillo	André (1899-1903).
Osmia fertoni Perez	*Stenomutilla argentata* (Viller)	Ferton (1908).
Osmia tunensis	*Stenomutilla argentata* (Viller)	Ferton (1908).
Osmia saundersi Vachal	*Stenomutilla argentata* var. *saundersivora* Ferton.	Ferton (1921).
Anthidium contractum Latreille	*Mutilla lichtensteini* Tournier	Tournier (1889).
Anthidium emarginatum (Say)	*Photopsis unicolor* (Cresson)	Davidson (1894).

It is remarkable that the hosts of only 39 species of Mutillids are known, in view of the fact that the number of species of the latter that have been described runs into the thousands. The knowledge that we have of this phase of Mutillid biology is most meager, and the need for further investigation is apparent. It is probable that many species of these wasps may have some economic importance, as in the case of the three species attacking the tsetse fly. It can also be predicted with certainty that as a more complete knowledge of the host relationships of the Mutillids is gained, more facts regarding the phylogeny of the group will be brought to light.

The possibilities as to the range of the host relationships is more or less unlimited on account of the little information that is known. Thus it may be that many Coleoptera serve as hosts for Mutillids (s. str.) in addition to the Clythrid beetles mentioned in the table. The validity of this relationship seems to be fairly well established, having been observed by two different workers. It is quite improbable that *Glossina morsitans* Westwood is the only dipterous insect involved as host, and as our knowledge becomes more complete many other Diptera will likely be shown to be hosts of these insects. It is interesting to note at this point that Lamborn (1925) has succeeded in rearing *Mutilla glossinae* from the pupae of Sarcophagid flies. Previously this species had been known to parasitize only *Glossina morsitans*. Lamborn states that seven male Mutillids were reared from 10 Sarcophagid puparia which were submitted to a female *Mutilla glossinae*. Whether other orders of insects than the Coleoptera, Diptera, and Hymenoptera serve in this relation it is impossible to say.

Even among the hymenopterous hosts the information available is often vague and sometimes doubtful. It must be borne in mind that the relationships as tabulated above are not definitely established in every case. In some instances the identification of the Mutillid appears to be incorrect, and the possibility exists that the host may be incorrectly identified since the records are not all based on rearing experiments carefully carried out.

Two conclusions may be drawn from this tabulation: (1) A single species of Mutillid is not limited to a single species or genus of Hymenoptera or Diptera for a host; this is clearly shown in the case of *Mutilla europaea* Linneaus and *Dasymutilla bioculata* (Cresson). However, in the latter instance the two genera which serve as hosts, *Bembix* and *Microbembex*, are very closely related; (2) a single species of the host insect may be the host of more than one species of Mutillid. This is established in the case of *Glossina morsitans* Westwood, but has not been demonstrated in the case of the hymenopterous hosts.

M. europaea Linnaeus is found generally distributed in the nests of a number of species of bumblebees in Europe. It is rather remarkable that none of the American bumblebees have been found to be parasitized by Mutillids. Certainly many more species of bees and wasps in America are parasitized by the Mutillids than we now know. In the case of those species of bees and wasps that nest in colonies it should be a comparatively simple matter to discover the Mutillid parasite, if one exists, on account of the concentrated numbers of the host. The cocoons of the host in such cases can be collected in fairly large numbers and reared in the laboratory, and during this procedure the parasite will nearly always be discovered. In addition there will often result a correlation of the male and female of a single species of the parasite which may have been previously known as two species. It is to be hoped that many of these potential Mutillid hosts may be investigated in the future.

So far the only hymenopterous insects found as hosts of Mutillids are the various species of wasps and bees. André (1902*b*) has suggested the possibility that the ants may serve as hosts in some cases but this has never been verified. The field of investigation here is a large one and the possibilities almost unlimited because so much remains unknown, and the hosts that are known are distributed in at least three orders.

TYPICAL LIFE HISTORY OF A MUTILLID WASP

From the facts that are available due to the efforts of Drewsen, Hoffer, Borries, Lamborn, Williams, and Ferton it is now possible to formulate a typical life history of a Mutillid wasp. Such a life history will not always represent the conditions in each specific case but will serve as a type which can be modified more or less to suit individual cases. This typical life history is as follows:

1. Host: Coleoptera, Diptera, and Hymenoptera (either fossorial wasps, social wasps, solitary bees, and social bees).
2. The host is attacked in the prepupal or pupal stage, after its cocoon has been spun, or the puparium formed. The host is then in a quiescent stage and apparently the Mutillid does not paralyze the host with its sting. [This does not include the Methocas, which are not considered Mutillids (s. str.).]
3. The female Mutillid penetrates the cocoon or puparium with its ovipositor and deposits the egg, either by attaching it to the host, or to the inner wall of the cocoon. Occasionally two eggs may be laid in the same host cocoon.

4. The tiny Mutillid larva hatches from the egg, and begins feeding on its host. It devours the latter and becomes full grown within a few days, and then spins its own cocoon within that of its host.

5. In the colder latitudes the winter is passed in the prepupal stage within this double cocoon. There is one generation a year. In tropical and subtropical regions the generations probably number at least two and perhaps several each year.

6. The males and females emerge; the males being winged, seek out the females and mating takes place. The act of copulation requires only a few seconds. Bertkau (1884) states that he placed a male and female of *Mutilla ephippium* in a glass bottle, that copulation took place and that mating lasted 25 minutes. Other observations do not confirm this, the general observation being that mating lasts only for a few seconds. If mating lasted for a longer period it is probable that more specimens would be taken *in coitu* than there are at present.

EFFECT OF ENVIRONMENTAL FACTORS ON INDIVIDUALS OF THE SAME SPECIES

Many writers on the Mutillidae have been greatly impressed with their variability and have been led to the conclusion that the group does not present structural characters upon which a reliable classification of the species and genera may be made. While this is true to a certain extent, it is the opinion of the writer that variation in the Mutillids has been greatly exaggerated and that the species of these insects really present good tangible structures which may be used taxonomically. The impression of great variation in this family is partly due to the fact that many good specific characters have been overlooked and very often series of specimens representing five or six different species have been regarded as one species. On the other hand there are some notable variations even in a single species, and these of course have only added to the confusion. The two principal variations to be found among individuals of the same species are, (1) variation in the color of the pubescence of the body, and (2) variation in size.

A number of species in the genus *Dasymutilla* have the body clothed with dense pubescence. In several species the color of this pubescence varies from a deep red to a light golden yellow. This is the case in both *D. fulvohirta* (Cresson) and *D. occidentalis* (Linnaeus), and occurs in both sexes. What the causes underlying this variation are, is not known. It can hardly be due to a fading action of wind and moisture, although such a cause is possible. All degrees of this variation occur throughout the range of the species. It is very likely that this variation is brought about by some factor in the environment.

The variation in size of individuals of the same species was noted by Hoffer (1886) and he attributed this difference to the food supply of the Mutillid larva. The following is a translation of his paragraph on this subject.

> Regarding the size of single individuals of *Mutilla europaea*, there is an extraordinary difference in this respect; it depends upon the size of the bumblebee pupa consumed by it; therefore a female, which has developed from an enormous female of *Bombus mastrucatus*, is extraordinarily larger than another which has been forced to feed on the worker pupa of *Bombus agrorum*, so that one may mistake the two size differences very easily for species differences. The largest female of my collection (developed from a female pupa of *B. mastrucatus*) measures more than 26 mm. in length, the smallest (from a nest of *B. agrorum*) is scarcely 10 mm. long.

This kind of variation was also brought to the notice of the writer very forcefully in the case of *Dasymutilla bioculata* Cresson, where it was found that the individual specimens could be arranged in series of two different sizes, apparently representing two different species. A detailed study of this species was made in 1922 and 1923 and reported on (1924) as follows:

> That there are variations in size among individuals of the same species of insect is well known among entomologists and has been the subject of a number of investigations. These have had as their object either collection of data regarding the character and extent of the variations, or the demonstration of the causes for the phenomenon itself. The variations which are present in various species of animals and plants may be divided into two very fundamentally different classes: those which are genetic in character, and those of an ecological nature. Variations of the first class are due to some reaction that occurs in the germ plasm, while those of the second class are due to the effect of some stimulus in the environment, and are therefore ecological. The principal ecological factors which have been suggested as causes for variation in size are temperature, humidity, light, chemical stimuli, and nutrition, the last-mentioned including both quantity and quality of food. An excellent review of the literature on this subject has been made by Bachmetjew.[1] In the case to be discussed the factors of temperature, humidity, light, chemical stimuli, and quality of food apparently vary in a uniform manner, while the quantity of food is small in some cases and large in others.
>
> The quantity of the food supply has been used by a number of authors to account for the variations in size which occur within the same species of insect. Koch[2] studied the lepidopteron *Vanessa io* var. *joides* Dahl and concluded that it was a variety based on small specimens of *Vanessa io* and that their small size was due to the starvation of the larvae. Berlepsch[3] performed an experiment with the larvae of queen bees and states that he was able to reduce the size of the queens by reducing the food supply of the larvae. Kleine[4] states that worker bees of inferior size are produced from poorly fed

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[1] Bachmetjew, P. 1907. Experimentelle Entomologische Studien, vol. 2, pp. 299–312, 596–597, 765–768. Staatsdruckerei, Sophia.

[2] Koch, G. 1856. Die Schmetterlinge des westlichen Deuschlands. Kassel.

[3] Berlepsch, A. v. 1860. Die Biene und die Bienenzucht in honigarmen Gegenden nach dem gegenwärtigen Standpunkt der Theorie und Praxis. Mühlausen im Thüringen.

[4] Kleine, G. 1867. Ueber das Gesetz der Entwickelung der Geschlechter bei den Insktn. Zeitschr. für wissnsch. Zool., vol. 17, pp. 533–558.

worker larvae. Brehm[5] reared a specimen of the dipteron *Anthrax semiata* or *morio* L. from the cocoon of a bumblebee. He thought the variations in the size of this species were due to different quantities of food which were available to the larvae. Stepanow[6] found that the larvae of the bombyliid *Systoechus leucophaens* Meigen had different sizes which he thought depended upon the quantity of food in the egg masses of the orthopteron, *Stauronotus vastor* Stevens, upon which the larvae feed. The adult flies also exhibited the same variation. Standfuss[7] reared the larvae of *Aglia tau* L., a saturnid moth, on a subnormal amount of food and obtained adult moths which were much reduced in size. Bordage[8] reports a similar experiment with *Atella pholonta*, a vanessid. Rudow[9] observed the variations in size which are present in the species of various genera of the aculeate Hymenoptera and states that the quantity of food available to the larvae of these forms is undoubtedly the cause of the variations in size. Herms[10] conducted some feeding experiments with a sarcophagid fly, *Lucilia caesar* L., in which he allowed the larvae to consume as much as they would, and varied the length of the time of feeding. These time periods varied from 36 hours, which seemed to be the lower limit at which adults could be secured, to an optimum period of from 60 to 72 hours. He obtained adult flies varying from a minimum size with 36 hours' feeding to the normal size which were fed for a period of 60 to 72 hours. Wodsedelak[11] has carried on some interesting experiments with the larvae of a dermestid, *Trogoderma tarsale*, in which he has been able to vary their size from large to small by starving, and from small to large by feeding again. No data are available as to the effect of this sort of feeding on the adult beetles.

In all of the cases which have been reviewed it is obvious that the variations have to do with a single species. If a graph is made representing the frequency and range of any of these variations the resulting curve is unimodal, that is, all of the specimens exhibiting variation group themselves progressively around the most abundantly represented form. If, however, the circumstances should be such that when a graph of the frequency and range of the variation is made, the resulting curve is bimodal, it is not so apparent that one is dealing with a single species. In fact, from an examination of museum specimens only, one might be led to the conclusion that two species were represented rather than one, and an investigation of the organism and its enviroment would be necessary before one could arrive at the true state of affairs. In cases of this kind the variation may appear to be discontinuous but a study of the data seems to show that it is more correct to consider it as a continuous variation of the bimodal type, and such variation may well be designated as bimodal. It is conceivable that variations of this kind occur which may show curves with three or even more modes. Kellogg and Bell[12] have mentioned the possibility of bimodal or even polymodal variations.

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[5] Brehm, Alfred Edmund. 1869. Illustrirtes Thierleben, I. Auflage 6. Wirbellose Thiere. Hildburghausen.

[6] Stepanow, P. G. 1882. Ueber Metamorphosen bei Dipteren der Familie Bombylidae, Arbeit. der Naturforscher-Gesellsch. bei der Univers. zu Charkow, vol. 15 (1881), pp. 1–9.

[7] Standfuss, M. 1896. Handbuch der paläarktischen Grossschmetterlinge für Forscher und Sammler. 2 ed. (392 pp.). Jena

[8] Bordage, Edmond. 1899. Expériences sur la relation qui existe entre la couleur du Mileu et la couleur des Chrysalides de certains Lépidoptères, Proc. Fourth Int. Cong. Zool. Cambridge, pp. 235–244. London.

[9] Rudow. 1900. Weiterer Beitrag zu den Grössenverhältnissen der Insekten, Insekt.-Börse, vol. 17, no. 24, pp. 188–189.

1900. Ueber die Grössen-Variation bei Insekten, Insekt.-Börse, vol. 17, No. 2, pp. 10–11.

[10] Herms, William B. 1907. An Ecological and Experimental Study of Sarcophagidae with Relation to Lake Debris, Journ. Exp. Zool., vol. 4, pp. 45–83.

[11] Wodsedalek, J. E. 1917. Five Years of Starvation of Larvae, Science, vol. 46, pp. 366–367.

Dasymutilla bioculata (Cresson) offers a good example of variation which displays the bimodal characteristic. When a large number of individuals of this species are arranged in a gradatory series, the curve expressing the frequency and range of the differences in size is bimodal. The case is an interesting one because the variation in size can be definitely attributed to an ecological factor, and because it emphasizes the importance of a knowledge of the ecology of an insect to a taxonomist in determining specific limits.

Dasymutilla bioculata is a Mutillid wasp which is exceedingly abundant in the sand dune areas of Minnesota. My attention was first attracted to the species in making a collection of Mutillidae in a sand dune area 2 miles north of the city limits of Minneapolis in Anoka County. The principal collecting ground in this sand dune area is a blow-out (a depression blown out by the wind in areas of shifting sand) about 10 acres in extent. During the season of 1922, nearly 1,200 specimens of Mutillids were collected in this blow-out. Other species of Hymenoptera were also abundant, particularly two species of Bembicidae, *Bembix pruinosa* Fox and *Microbembex monodonta* Say, and the Sphecid wasp, *Sphex argentatus* Hart. In general, the hymenopterous fauna of the sand dune areas of Minnesota is very similar to that of the sand areas of Illinois, which has been discussed by Hart (1907). The collection of 1922 showed that the most abundant Mutillid in this blow-out was the male *Dasymutilla bioculata* (Cresson), and the female *Dasymutilla chlamydata* (Melander), which was described from specimens taken in the Illinois sand areas. When this material was worked over for classification, it was found that the 440 specimens of the female *chlamydata* could be separated into two series according to size, that is, those varying between 6.5 mm. and 10 mm. and those varying between 11 mm. and 15 mm. The 206 specimens of the male *bioculata* could also be separated into two similar series. No structural characters could be found for separating these two series, either in the female *chlamydata* or the male *bioculata*. The genitalia of the males in the two series were compared, but no differences could be found. Hart (1907) first suggested that *chlamydata* was probably the female of *bioculata*, but retained the name *chlamydata* for all his specimens. During the season of 1923 specimens of the female *chlamydata* and the male *bioculata* were reared from the same host and were successfully mated in the laboratory. Specimens were also taken *in coitu* in the field. *Dasymutilla chlamydata* Melander therefore becomes a synonym of *Dasymutilla bioculata* (Cresson).

Knowing that the Mutillidae are parasitic upon wasps and bees, and that the species *Microbembex monodonta* Say and *Bembix pruinosa* Fox were the most abundant Hymenoptera in the blow-out, it occurred to me that probably they were parasitized by one or more species of the Mutillids. It also seemed probable that *Dasymutilla bioculata* was the Mutillid concerned, parasitizing either one or the other, or both of the Bembicids.

I therefore collected 285 cocoons of *Microbembex monodonta* on May 29 and brought them to the laboratory. Eighty-five cocoons of *Bembix pruinosa* were collected on June 30 and brought to the laboratory. Each cocoon was placed in a glass vial so that a definite record could be kept of each one. From the 285 cocoons of *Microbembex monodonta* I obtained six males and five females of *Dasymutilla bioculata* ranging in size from 7 to 10 mm. From the

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[12] Kellogg, Vernon L., and Bell, Ruby G. 1904. Studies of Variation in Insects, Proc. Wash. Acad. Sci., vol. 6, pp. 203–332.

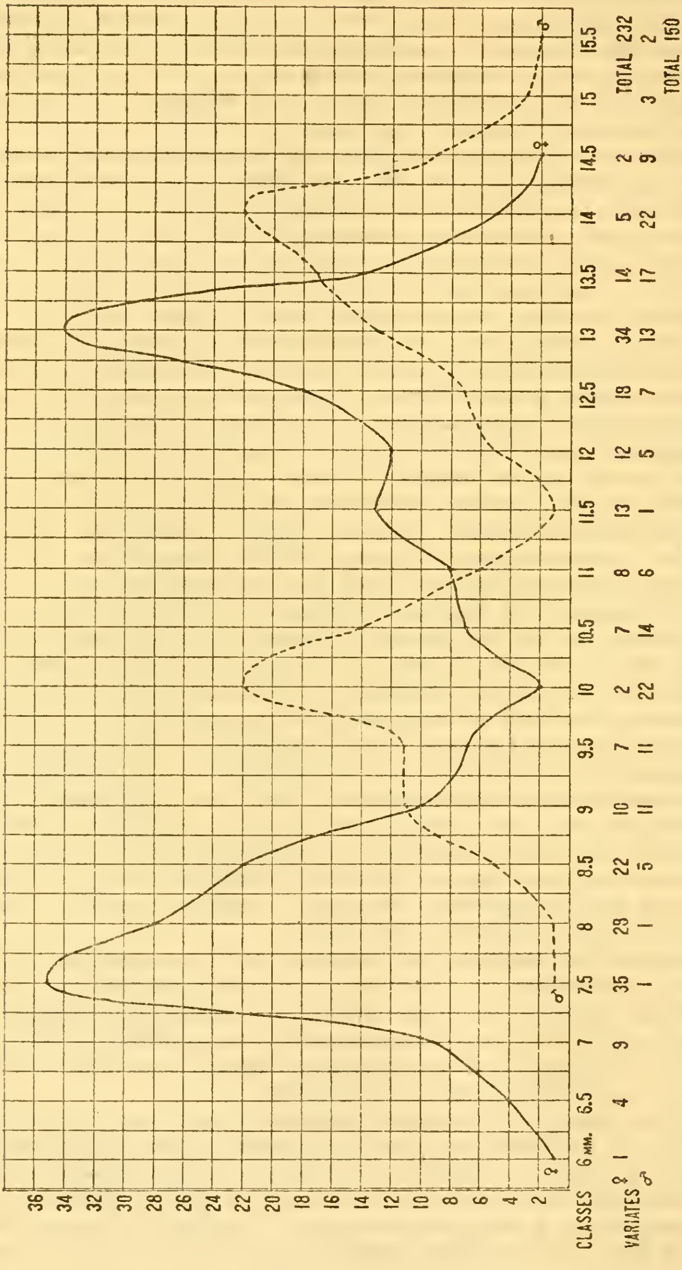

FIG. 1.—FREQUENCY CURVE OF VARIATION IN SIZE OF MALE AND FEMALE OF DASYMUTILLA BIOCULATA CRESSON.—MICKEL

85 cocoons of *Bembix pruinosa* I obtained one male and three females of the same Mutillid ranging in size from 11 to 15 mm. When a recently emerged female of the latter group was placed with a male of the small series they mated immediately. The specimens taken in copulation in the field had the following length measurements: Female, 6.5 mm. and male 11.5 mm.

The adults of *Microbembex monodonta* vary in size from 8 to 14 mm. while those of *Bembix pruinosa* vary between 16 and 19 mm. The same proportional differences exist in the size of the mature larvae of the two species. The larvae of *Dasymutilla bioculata* parasitize the cocoons of both the small *Microbembex* and the large *Bembix* and entirely consume the Bembecid larvae before they enter the prepupal stage. The specimens of *bioculata* emerging from the cocoons of the small *Microbembex* vary in size from 6.5 to 10 mm., while those which emerge from the large *Bembix* vary in size from 11 to 15 mm. Inasmuch as temperature, humidity, light, quality of food, and other ecological factors vary uniformly in this sand dune area, while we know that the quantity of food is considerably less in the *Microbembex* cocoons which produce the small *bioculata* than the amount of food in the *Bembix* cocoons which produce large *bioculata*, it seems justifiable and reasonable to conclude that the quantity of food available to the larvae of *Dasymutilla bioculata* is the factor which determines the size that the adult will be. The quantity of food may be either large or small according to the species of Bembicid which the Mutillid parasitizes.

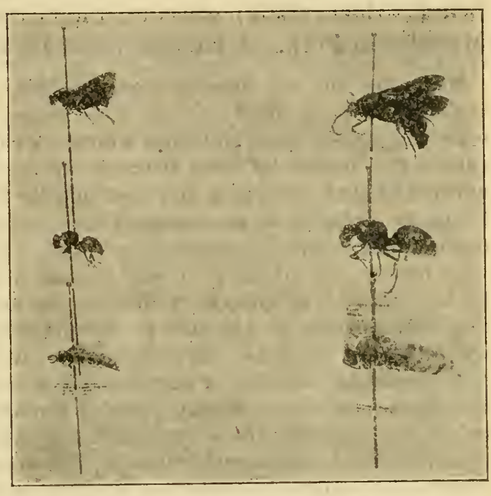

FIG. 2.—CORRELATION IN SIZE BETWEEN DASYMUTILLA BIOCULATA CRESSON AND ITS HOSTS MICROBEMBEX MONODONTA SAY (LEFT) AND BEMBIX PRUINOSA FOX (RIGHT). IN EACH VERTICAL ROW: MALE ABOVE, FEMALE IN THE MIDDLE, HOST BELOW

As stated previously, when a curve is plotted representing the frequency and range of the variation in size of a large number of specimens of *Dasymutilla bioculata* the curve will be found to be of the bimodal type. The first mode will represent the specimens which as larvae were parasites of *Microbembex monodonta* Say, and the second mode will represent the specimens which as larvae were parasites of *Bembix pruinosa* Fox. Thus it is clear that in this case at least, what appears from an examination of museum specimens to be a specific difference in size is in reality an ecological variation of the bimodal type, due to a difference in the quantity of the food supply.

ECONOMIC IMPORTANCE

It can not be doubted that a group of insects so numerous in species as the Mutillids must be of more or less economic importance. The relationships which these wasps have with their numerous but unknown hosts must finally reflect themselves in the relation of insects to man although it may be somewhat indirect.

The female Mutillids are noted for the severity of their sting. Whether this reputation is justified or not is very difficult to say. The effect of their sting is regarded by many people as more severe than that of most other Hymenoptera. This is particularly true of the larger species. Mendenhall (1883) describes the effects of the sting of *Dasymutilla occidentalis* Linnaeus and says that the sting caused severe pain and considerable swelling, but that the symptoms were not alarming. Deschamps (1898) reports on *Dasylabris maura* (Linnaeus) on the island of *Cypris.* He states that they are called "Sphalangids" by the natives and that their sting is regarded as fatal. He was not able to find any evidence in confirmation of the belief. Baer (1901) gives an interesting account of the sting of a Mutillid in Peru. A translation of his article is as follows:

> Regarding the hot forest regions of Peru, my investigations indicated that the stings to be dreaded most are those caused by ants of the genus *Ponera* and especially by the large Mutillids, which are called the "Isoula." The suffering caused the natives by these stings is similar to that caused by boiling oil or burning alcohol. The pain may continue for 24 hours or longer without diminishing in intensity, is accompanied by a great inflammation more or less extended, with intense fever, sometimes with delirium and vomiting, and recovery may require several days. I saw a woman stung on the bottom of the foot by an "Isoula," at Tocache, rolling on the ground and crying out. An application of carbolic acid a quarter of an hour after the accident did not give any relief. In the same village I found an Indian woman to whom the terrible pain caused by the sting of an "Isoula" had caused a premature confinement. The natives do not know any effective remedy for these wounds; in order to reduce the suffering, the sting, which generally remains in the wound, should be removed immediately with the aid of a needle. Doubtless this is the Mutillid that the Indian Quetchuas at the time of the Incas, according to Tschudi, gave the name "Sisi huakan nahui, la fourmi qui fait pleurer." However, they could not have been very sensitive to the pain. While the winged male, without a sting, is found on bushes the female "Isoula," which is apterous and possesses a very long sting, is frequently found on the ground in the paths as well as in the dense forest, so that the Indians who go barefooted or with a single sole fastened on with small cords, are generally stung on the foot; the traveler is protected from this dreaded insect by good shoes. Very fortunately these Mutillids are always solitary, because if one was attacked by a number of individuals at a time, the wounds caused by the numerous stings would be very serious and might have a fatal result.

The writer has been stung several times by the species of Mutillids found in Minnesota, but has not found their sting any more painful than that of other Hymenoptera. Usually the pain ceases 5 or 10 minutes after one is stung. It is probable, of course, that some persons are more susceptible to the effects of stings than others and that in some cases they might be quite painful. It may also be pointed out that, so far as is known, the sting of the Mutillid does not remain in the wound.

Inasmuch as Mutillids are known to attack solitary bees, and bumblebees, they might reasonably be expected to be parasites of the honeybee. Several cases are known of Mutillids attacking honey bees. C. V. Riley (1870*b*) published a letter from a correspondent at Clarksville, Texas, regarding one of these instances:

> A few days since, while in my apiary watching a hive at work, I observed a very large female (Cowkiller) running over a flowering peach tree that overshadowed the "gum." Finally she came down and entered the hive. I tilted the "gum" to see what she was doing and found a number of bees trying to dislodge her, but to no purpose. Whenever she could shake them off sufficiently she would continue her march over the bottom board in search of food, picking up fragments of comb and young bees, and occasionally sending a bee to its final account with her formidable sting, and caring but little for their rage and fury; encased as she is in her impenetrable armor, she bids defiance to the puny stings of bees. Finally I had to come to their aid. Since then I have had to free several other hives from these depredators.

This is the only case of Mutillids attacking hive bees reported from the United States. A second case is reported from Europe, however. Schoenfeld (1878) published a letter written to him by a cooperator describing the attack of *Mutilla europaea* on honeybees. A translation of the letter and Schoenfeld's remarks follows:

> The five living insects enclosed are a very frequent occurring enemy of bees in our region, of which the scientific name is probably *Mutilla europaea*, or bee ants, and of which, to my knowledge, no mention is made in any of the bee journals nor in any handbook of bee culture. I have taken two of these specimens out of the beehive myself, and even from the brood layer itself, but the other three were caught before they had entered the hive.
>
> The presence of these insects in a hive is apparent a short time after their entrance by the bees rushing out at the entrance, engaged in a death struggle, with convulsive movements of the appendages, the extruding of the proboscis, and contraction of the body, but often continuing to live for a day. That these symptoms are caused by a poisoning of the unfortunate animals from the sting of the enemy is not improbable. I have found as many as 200 bees killed in this way in a hive within 24 hours. On rainy days, when the bees do not remove the corpses so easily, and the fatally injured ones do not rush out the entrance, they cover the bottom layer as completely as in a spring purification. A hive in which this insect has remained for some time will become so sparsely populated that as a rule it does not swarm and sometimes is even entirely exhausted.
>
> This bee enemy which I have not met with anywhere outside of the region of my present activity (Gutenstein, in lower Austria) has occurred here for many years and is a great menace for the beekeeper. During the last three weeks I have caught and destroyed at least 100 specimens of it. Since the animal is wingless (the males are winged, but are not injurious to the bees), one can protect against their presence by isolating the beehive from the ground, which is accomplished by smearing it with pitch. The litter of ashes which is so effective against ants does not appear to furnish sufficient protection against the *Mutilla*. The insect occurs from the beginning of April until late in autumn, although it usually only displays its murderous activities up until the end of warm weather.

This insect is not a free living one but is a brood parasite. It lays its eggs in the nests of bumblebees, where it breeds at the expense of the bumblebee brood. Mutillids of both sexes are ordinarily found in the bumblebee nests in our high mountain regions, especially toward autumn. I think, therefore, that the mutillid female, in order to lay its eggs in the cells of the bee, goes into the hive, but there as a bold invader it is attacked by the bees, and the bees in turn are stung to death—possibly bitten to death. A careful investigation of the respective organs of the *Mutilla* may settle the point as to whether it is stinging to death or biting to death. The sting is very long and appears to provide a murderous weapon against the bees. Since the abdomen of the *Mutilla* is so well armored, the bees can do nothing to it and offer their lives uselessly in combat with the enemy.

Whether egg laying is really the object of the invasions may be easily determined by an anatomical investigation of the ovaries; if the ripe egg is found in these, then my view will be established. This fact is unimportant except from an academic viewpoint, but the sympathy which we show toward our pets, the bees, on every occasion certainly justifies my curiosity concerning it and impels me to learn the reason for such a tragedy in the apiary. I have observed it now four years, and it has been the despair of our beekeepers many times.

Schoenfeld's remarks are as follows:

Whether the mutillid larva occurs as a parasite on the bee maggots, and whether the female mutillid also seeks out the beehives in order to deposit its eggs, can naturally only be learned by careful observation of the hives which are attacked by the mutillids. One can not draw a safe conclusion from the presence of mature eggs in the ovaries of the mutillids which are seized in the brood chambers of the bees. Insects carry their eggs around with them for a very long time, even though these are ripe for deposition, until they find a suitable place in which they are able to deposit them. One finds, for example, living larvae in the abdomen of the blowfly very frequently, which have developed from eggs, because the mother had not found an opportunity to deposit the eggs at the normal time. From the circumstances that only the female, but not the male, of the mutillid is dangerous to beehives one can not with certainty draw the conclusion that the females enter the beehives for the purpose of ovipositing. Both sexes lead a separate life for the most part. While the males usually visit flowers, they are also frequently found on leaves where there are colonies of plant lice, and one usually sees the female running around busily on sandy paths and slopes. It is quite possible that the mutillids only enter the beehives in order to obtain food there. They appear to scorn honey. My specimens, although very hungry, left it untouched; nor did they know how to begin with a young drone larva which I put before them. When I crushed a delicate nymph they eagerly examined the exuding fluid and licked it up like a dog.

But what ever induces them into the beehive, the calamity which they cause therein according to the description of Herr Schachinger, is great enough to designate them as a mischievous enemy of bees. He surmises that they bite or sting the bees to death. From the anatomical and microscopical investigations that I have made of the five specimens submitted to me, I am only able to state that the mouth parts of these insects appear to be unsuitable for killing, while the stinging apparatus appears to me to be well adapted for that purpose. The mandibles although very hard are much too short, so that they would only be able to seize or hold a bee. On the other hand the sting is extraordinarily long and sharp and can be stretched out with incredible quickness in all directions. It functions primarily as an ovipositor and is therefore so long, but that it also serves as a weapon, one perceives easily if one seizes and holds a Mutillid. Immediately the sting will be extruded and bends itself quickly above and below, to the right and left around in a circle, in order to strike the enemy anywhere. Perhaps this extraordinary nimbleness and skill is made possible by the very conspicuous and massive muscle apparatus which the insect possesses. That the sting may also act as a weapon for murder is not to be doubted, but whether it does this in fact must be verified by observation of an attacked bee colony. It is possible that the bees troubled and irritated by the attack of the Mutillids mutually kill themselves.

A third case of injury to honeybees by Mutillids was reported by Scholz (1879). The circumstances are somewhat similar to the previous account by Schoenfeld but the observations differ in several particulars. A translation of the observations reported by Scholz is as follows:

1. An official of this place, Beekeeper P., observed a bumblebee in the forest one day tumbling around in a frightened manner. Upon closer observation the bumblebee was found to be struggling with a bee wolf (*Mutilla europaea*). It would have been a small matter for the bumblebee to have taken herself high in the air with the enemy riding on her back; instinctively she knew that getting rid of the enemy in falling was impossible; therefore she tumbled around on the ground for a long time and finally when the enemy was brushed off she flew away; the bee wolf eager for plunder ran around in every direction looking for his victim.

2. The same man, when removing some wooden garden implements during the summer, noticed a bee wolf running around under them. Remembering the contest between the bumblebee and the bee wolf he observed the latter for a long time undisturbed. Soon it sought out a hiding place, and would run out from its ambush to examine every insect passing by. A hard-winged carabid beetle passed by; quickly the bee wolf sprang out from its hiding place, examined the beetle and allowed it to pass unharmed; it repeated this several times with other beetles; the fourth beetle, a different species with a softer body, was destined to be the victim. With a spring the bee wolf was on the beetle grasping it firmly by the back of the neck, martenlike, and was carried away riding on the beetle, whereupon later they both drew away from the eyes of the observer into the deep grass.

3. In the past summer the above authority noticed that a bee wolf could enter a beehive undisturbed on a bright day. The swarm remained quiet without being aroused into activity. On the next day the bee wolf was at the opening of the hive on a separating board under the third super and without being hindered examined the mass of bees hanging on the under side of the separating board, until at last after a long search, the bee wolf disappeared into the mass of bees. This is proof that the bee wolf will be received by the bees without hindrance. When this case was made known to me I requested the man concerned, who lived near me in the neighborhood, to call me when the bee wolf appeared again on the inside of the hive so that I could capture this dangerous bee enemy. A few days later, on Sunday morning, I received the news that the bee wolf was on the floor of the hive and I hurried quickly to the place.

> The closed hive had been opened again and 30 dead bees lay on the floor of the hive; the bee wolf was supposed to be present among these. Since the bees lay singly, against and over one another, a quick glance convinced me that the opposite was true; it was further asserted, however, that the bee wolf must be found under the fallen bees. At this moment a honeybee fell from the mass of bees and tumbled around on the floor of the hive with the bee wolf riding on it and firmly biting at the back of the neck. The window of the lower story was quickly opened and the bee wolf was captured. In examining the bees strangled by the bee wolf, the injury was always found at the back of the neck between the head and the thorax, and was sucked out from this place, vampirelike.
>
> 4. Permit me to quote verbatim the case experienced by Füssel in Rosenthal at Königstein (see D. Bienenfreund, Jahrgang 1877, p. 233) of the destruction of the bee brood by the bee wolf and the consequent weakening of the colony.
>
> My neighbor, Herr Kaufmann R., had received a short time before a colony of Italian bees and he had requested me to help him remove them from the transportation box to the hive. On this occasion he showed me a small weak colony in a straw hive which he thought was queenless; the bees became fewer every day, so that he at the best, since there was still much honey in the hive, might introduce the newly arrived Italian bees. I therefore cut away three combs and on the fourth I saw how this insect, the bee wolf, was procuring its subsistence on the still present brood. I took it, and after I had shown it to Herr Kaufmann R. and we had convinced ourselves of the manner in which it worked on the brood, I killed it, cut away the empty combs completely, left the few bees which were still running around between the honeycombs and introduced the Italian bees. Early on another day Herr Kaufmann R. found a magnificent German queen bee under some dead Italian bees on the floorboard stung to death. The hive had not been queenless. The bee wolf not only prevents the growth of the colony, but it is so injured that little by little, slowly but surely, it goes toward its ruin.

The above accounts do not agree regarding the details of how *Mutilla europaea* attacks honeybees, but it is certain that the authors were convinced that *M. europaea* was the cause of the trouble. I have been able to find no other records of injury to honeybees by any species of Mutillids but if these accounts are at all correct they must at least be considered as potential enemies and capable of inflicting more or less injury upon a hive of bees.

While it appears from the above accounts that Mutillids are perhaps potential enemies of honey bees, yet the paucity of reports regarding injury by them indicates that their activities in this respect are not at all general.

The relationship of three species of Mutillids to the tsetse fly in Africa has already been mentioned. This is a case where the Mutillids are directly beneficial to man as destroyers of this fly. It is probable that other species of tsetse flies are also parasitized by these or other species of Mutillids. Lamborn (1920) has suggested that the decrease in the number of tsetse flies over certain areas is probably due to the effectiveness of their parasites. When our knowledge of these relationships becomes more complete we shall no doubt find that they are much more extensive and important than is now suspected. Mutillids then are to be regarded as injurious or beneficial insects to man according to the points of view outlined above. They are probably active in one or the other of these roles more extensively than we think.

EFFECT OF TEMPERATURE ON THE ACTIVITY OF MUTILLIDS

In 1922 I was extremely fortunate in learning of a sand-dune area north of Minneapolis, Minnesota, where Mutillids were exceedingly abundant. During the summer of that year I spent a number of days collecting these insects, and it was apparent from the first that the abundance of individuals varied at various times of the day. For example, very few Mutillids could be found on the sand dunes before 8 o'clock in the morning. The number of individuals increased after that time, and collecting was good until about 11.30. From this time until 2.30 in the afternoon Mutillids were scarce, and then the numbers increased again, and collecting was good until late in the afternoon. This fluctuation in the abundance of individuals at various times of the day was thought to be due to temperature, but no definite data were secured.

Chapman and others (1926) studied this same sand-dune area and the insects characteristic of it. They found that the physical conditions of the environment on this sand-dune area were essentially like those characteristic of deserts. The highest temperature record obtained on the surface of the sand was 56° C. No winter temperature records were made, but temperatures as low as −40° C. have been recorded for this vicinity. It was found that during the normal course of the day all the insects leave the surface of the sand when its temperature nears 50° C. In order to avoid this temperature, some climb grasses and some enter their burrows, while others fly about some distance above the sand, making hurried landings to enter their burrows. The female Mutillids were consistently the last to retreat when the temperature rose and the first to return to the open sand when the temperature fell. On July 24, 1923, and August 2, 1923, observations were made early in the morning to determine the time and temperature at which the various insects appeared upon the sand. On July 24 the first Mutillid seen was a male at 5.45 a. m., when the air temperature was 23° C. and the temperature of the surface sand was 17° C. On August 2 the first Mutillid seen was at 6.55 a. m., when the temperature was approximately 18° C. In a laboratory experiment in which approximately eight female and eight male Mutillids were used, and in which temperatures were controlled and gradually raised from 10° C. to 60° C., the following results were obtained: All were inactive at 10° C.; the first movement of either male or female Mutillid was 14° C.; the male stood on his legs at 15° C. and the female at 17° C.; the first crawling of the male took place at 17° C. and the female at 18° C.; all of the males were active at 18° C. and all the females at 20° C.; normal activity of the males began at 22° C. and of the females at 24° C.; first paralysis due to temperature occurred in both males and females at 46° C.; the first male down occurred at 51° C. and the first female at 52° C.; all males were down at 53° C. and all females at 55° C. It will be noticed that the zone of activity here embraces 35° C., while it was found that for some of the sand-dune insects this zone was narrowed to 14° C.

> The successful sand dune insects are capable of either enduring great extremes, or of avoiding them by choosing the times and places for their activities. The Mutillids which parasitize the larvae of bembecids are limited in their choice of space by the lack of wings in the females. Being unable to leave the surface of the sand except by entering burrows or climbing the sparse vegetation, their success on the dune seems to be due to the high temperature which they can endure. Thus their limitation in space seems to be compensated by their increased endurance of high temperature.

The specimens observed were for the most part *Dasymutilla bioculata* (Cresson).

SOUND-PRODUCING ORGANS

Both the male and female sexes of Mutillids are able to produce sounds. In the larger species the sound is loud enough to attract one's attention at once while that made by the smaller species is only noticed if the insect is held close to the ear. The sound is produced by the rubbing of a transversely striated area on the base of the third abdominal tergite against a sharp ridge on the under side of the second tergite at the median apical margin. This is performed by the insect by moving the third abdominal segment in and out of the second segment. Mercet (1902) states that these sound-producing structures are present only in the true Mutillids and that the genera *Apterogyna* and *Myrmosa* and the species *Myrmilla calva* and *M. chiesii* do not possess sound-producing organs.

Christ (1791) was the first one to mention the fact that Mutillids were able to produce sound and has an interesting theory regarding its purpose. His remarks, translated, are as follows:

> I found further that the female made a loud piping sound like the voice of a young mouse if one held her between the fingers. When I heard this for the first time, and had a female Mutillid without wings between my fingers, I thought the sound came from a drone bee, a second insect; but I discovered at once that this bee (Mutillid) made the sound itself by the friction of the first segment of the abdomen with the following one lying under it, just like some species of beetles make the same sort of noise if they rub the neck on the prothorax, or the prothorax on the scutellum of the elytra. The first thing

> which naturally occurred to me was the thought, Why has nature, which does not do the least thing without a wise purpose, given this insect such a voice and why does it need this signal, since it does not go more than three steps from its home during its whole life? I busied myself with this thought as I approached a beehive to secure a bee in order to investigate this. But I did not get hold of it in the proper way and it made a noise with its wings; immediately so many workers came up on me that I did not wait to look around. This occurrence explained the puzzle to me, thus, that the benevolent nature had presented these wingless Mutillids this sound for speech in order to call out their brothers when they are in danger. If the others are able to fly away from danger and are able to give an alarm with their wings, then this pedestrian, this bird without wings, can call with a loud voice as well as use its sting. I convinced myself very authentically of the true basis of these conclusions. As I enjoyed a recreation hour and watched these differently formed dwellers in the earth flying in and out, and their wingless little wives go walking in the grass a few steps from their nest in the bright sunlight (which is their entire journey) I picked up a Mutillid and forced it to make a sound. Its own male not only came hurrying out immediately, but also the bumblebees and forced me to let my prisoner go free.

Goureau (1837) verified Christ's observation as to how the sound was produced with the correction that it was made with the second and third abdominal segments, rather than the first and second. One may legitimately assume that the purpose of a stridulating organ such as both sexes of the Mutillids possess is for the purpose of communication between the sexes. Peringuey (1899*a*) reports an observation made by the Rev. J. A. O'Neil that seems to confirm this assumption.

> The Rev. J. A. O'Neil has hit upon a very interesting mode of capture of both sexes by the so-called "sembling" method. He finds that by seizing hold of the female in such a way as to induce her to produce her well-known stridulating noise, the males immediately appear and swarm round, and even settle on the hand of the captor, and are easily secured. In that way he obtained both sexes of *M. cloantha* and *M. hecuba*, and the identity of the last-named species has been verified by the capture *in coitu* made quite independently by Doctor Brauns.

Räsänen (1915) has studied the stridulation apparatus found in some species of ants and states that the structures found there are similar in many respects to those found in the Mutillids.

While this stridulating organ has been noted and described a number of times no one seems to have observed any organ of hearing in the Mutillids. At the present time there is nothing to indicate what the nature and location of such an organ of hearing may be.

GYNANDROMORPHISM

Four cases of gynandromorphism have been observed among the Mutillidae. The first case to be observed was reported by Maeklin (1856) regarding a specimen of *Mutilla europaea* var. *obscura*

Nylander from Finland. This specimen was a lateral gynandromorph with the left half male and the right half female. Wheeler (1910) gives an account of a lateral gynandromorph of *Pseudomethoca canadensis* (Blake). In this case the left half was female and the right half male. A third instance is mentioned by Mann (1915) regarding a gynandromorph of *Dasymutilla fulvohirta* (Cresson). He described this one as follows: "This specimen is incompletely differentiated and is a crossed or decussated gynandromorph. The male side lacks wings, and all of the legs are typically male. The head is male to the right and female to the left, while the thorax and abdomen are male to the left and female to the right."

The fourth case is a specimen of *Dasymutilla hora*, new species (described hereafter) collected by Dr. J. C. Bradley at Spring Creek, Georgia, May 18–21, 1916. In this specimen the gynandromorphism is confined to the first four abdominal segments, and is not a perfect lateral gynandromorph as in the cases described by Maeklin and Wheeler. The head and thorax are entirely male in character, the antennae, wings, and legs exhibiting normal male characters on both the right and left sides. The first four segments of the abdomen are predominantly female although the first and fourth segments are modified by the male influence. The first segment is asymmetrical, with the left side ferruginous, clothed with sparse, erect pale hairs, glabrous and impunctate, and the right side of a dark mahogany red, clothed with sparse, erect black hairs and punctate; the apical fringe of the left side is pale and of the right side black. The second segment is asymmetrical basally where it joins the first segment but the appearance of the entire segment is very similar to that of the female *cypris* (Blake). The second tergite possesses four pale ferruginous spots and the apex of the segment is fringed with silvery pubescence interrupted medially by a spot of black pubescence. The third tergite is fringed with silvery pubescence slightly interrupted medially with black. The second, third, and fourth sternites are typically female, with thin apical fringes of silvery pubescence. The fourth tergite is both male and female; laterally both sides are male in that the pubescence is erect, long, dense and black; an area of similar pubescence is present adjoining and immediately to the right of the median line; the remainder of the tergite; that is, areas between this median spot and each lateral spot of erect, shaggy pubescence, is typically female with sparse, appressed, silvery pubescence. The remaining abdominal segments present male characteristics entirely. The genitalia upon dissection proved to be normal and like those of normal individuals of this species.

PART 2

TYPE SPECIES OF THE GENERA OF THE FAMILY MUTILLIDAE

The number of genera proposed up to the present time in the family Mutillidae is comparatively few, and about 75 per cent of these have been erected within recent years with a type species designated. On account of these two facts the nomenclatorial problems presented in a review of the genotypes of this group are neither complicated nor numerous. It is believed, however, that the information presented in this list of genera will prove valuable in future work in the classification of the family. It has also been pointed out by Rohwer and Fagan, Hyslop, Gahan and Fagan, and Lindsey that such a treatment of the genera is desirable for the purpose of promoting nomenclatorial stability. It is for these reasons that the following review of the type species of the genera of the Mutillidae has been compiled.

The original reference has been examined by the writer in every case. All of the generic names have been checked in Scudder's Nomenclator Zoologicus and the generic indexes of the Zoological Record to determine their validity. The following terms are used to designate the various ways in which the genotypes have been fixed:

Orthotype, a type by original designation.

Haplotype, a type by single reference (only a single species originally included).

Logotype, a type by subsequent designation.

Pseudotype, an erroneous type designation.

LIST OF GENERIC NAMES

AGAMA Blake (not Daudin, 1802); *Photopsis* Blake.
  Trans. Amer. Ent. Soc., vol. 3, 1871, pp. 218 and 258.
  Eighteen species originally included.
  Logotype: *Agama imperialis* Blake; by present designation.

ALLOMUTILLA Ashmead.
  Journ. New York Ent. Soc., vol. 7, 1899, p. 57.
  Haplotype: *Mutilla melicerta* Smith.
  Synonym of *Dasylabris* Radoszkowski according to André, Gen. Ins., vol. 1, fasc. 11, 1903, p. 65.

ALLONEURION Ashmead.
  Journ. New York Ent. Soc., vol. 7, 1899, p. 59.
  Haplotype: *Agama kokpetica* Radoszkowski.
  Synonym of *Pseudophotopsis* André according to André, Gen. Ins., vol. 1, fasc. 11, 1903, p. 21, and Bischoff, Archiv. f. Naturg., vol. 86, Abt. A, 1920, p. 94.

ANTENNOTILLA Bischoff.
Archiv. f. Naturg., vol. 86, Abt. A, 1920, p. 710.
Haplotype: *Mutilla phoebe* Peringuey.

APTEROMUTILLA Ashmead.
Can. Ent., vol. 35, 1903. p. 324.
Haplotype: *Mutilla aeda* Peringuey.

APTEROTILLA Bischoff.
Archiv. f. Naturg., vol. 86, Abt. A, 1920, p. 93.
Haplotype: *Mutilla bambata* Peringuey.

AREOTILLA Bischoff.
Archiv. f. Naturg., vol. 86, Abt. A, 1920, p. 174.
Proposed to include 2 species.
Orthotype: *Areotilla areolata* Bischoff.

ATILLUM André.
Gen. Ins., vol. 1, fasc. 11, 1903, p. 47.
Proposed to include 4 species, with one other doubtful.
Orthotype: *Mutilla bucephala* Perty.

AUREOTILLA Bischoff.
Archiv. f. Naturg., vol. 86. Abt. A, 1920, p. 314.
Haplotype: *Mutilla madecassa* Saussure.

BARYMUTILLA André.
Zeitschf. f. Hymen. & Dipt., vol. 1, 1901, p. 334.
Proposed to include 6 species, with 2 others doubtful.
Logotype: *Mutilla pythia* Smith; Ashmead, Can. Ent., vol. 35, 1903, p. 327.

BISULCOTILLA Bischoff.
Archiv. f. Naturg., vol. 86. Abt. A. 1920, p. 679.
Haplotype. *Bisulcotilla quadrisulcata* Bischoff.

BLAKEIUS Ashmead.
Can. Ent., vol. 35, 1903, p. 327.
Haplotype: *Mutilla bituberculata* Smith=*Myrmilla bipunctata* Latreille according to André, Spec. Hymen. d'Eur. et d'Alg., vol. 8, 1903, p. 447.
Synonym of *Myrmilla* Wesmael according to Bischoff, Archiv. f. Naturg., vol. 86, Abt. A, 1920, p. 54.

BOTHRIOMUTILLA Ashmead.
Journ. New York Ent. Soc., vol. 7, 1899, p. 55.
Haplotype: *Mutilla rugicollis* Westwood.

BRACHYMUTILLA André.
Zeitschr. f. Hymen. & Dipt., vol. 1, 1901, p. 287.
Proposed as a subgenus of *Mutilla* to include 2 species.
Logotype: *Mutilla* (*Brachymutilla*) *gynandromorpha* André, Ashmead, Can. Ent., vol. 35, 1903, p. 323; (one of the species originally included).
Pseudotype: *Mutilla* (*Brachymutilla*) *androgyna* André; Bischoff, Archiv. f. Naturg., vol. 86, Abt. A, 1920, p. 136. Invalid because type had already been correctly designated by Ashmead.

BRUESIA Ashmead.
Can. Ent., vol. 35, 1903, p. 306.
Haplotype: *Mutilla harmonia* Fox.

CEPHALOMUTILLA André.
Ann. mus. nac. Buenos Aires, ser. 3, vol. 10, 1909, p. 194.
Proposed to include 4 species.
Orthotype: *Mutilla diabolica* Gerstaecker.

CEPHALOTILLA Bischoff.
Archiv. f. Naturg., vol. 86, Abt. A, 1920, p. 509.
Proposed to include 9 species.
Orthotype: *Cephalotilla kamogana* Bischoff.

CERATOTILLA Bischoff.
Archiv. f. Naturg., vol. 86, Abt. A, 1920, p. 530.
Proposed to include 5 species.
Orthotype: *Mutilla dolosa* Smith.

CHRYSOTILLA Bischoff.
Archiv. f. Naturg., vol. 86, Abt. A, 1920, p. 312.
Proposed to include 2 species.
Orthotype: *Chrysotilla ochraceipes* Bischoff.

CTENOTILLA Bischoff.
Archiv. f. Naturg., vol. 86, Abt. A, 1920, p. 535.
Proposed to include 31 species.
Orthotype: *Mutilla pectinifera* André.

CYSTOMUTILLA André.
Mem. soc. zool. France, vol. 9, 1896, p. 263.
Proposed as a subgenus of *Mutilla.*
Haplotype: *Mutilla ruficeps* Smith.

DASYLABRIS Radoszkowski.
Horae soc. ent. Ross., vol. 19, 1885, p. 28.
Proposed to include 15 species.
Logotype: *Mutilla arenaria* Fabricius; Ashmead, Can. Ent., vol. 36, 1904, p. 7.

DASYLABROIDES André.
Zeischr. f. Hymen. & Dipt., vol. 1, 1901, p. 307.
Proposed as a subgenus of *Mutilla* to include 6 species with one other doubtful.
Logotype: *Mutilla capensis* Saussure; Ashmead, Can. Ent., vol. 35, 1903, p. 325.
Pseudotype: *Mutilla caffrae* Smith; Ashmead, Can. Ent., vol. 35, 1903, p. 331. Invalid because type had been designated correctly as above.

DASYMUTILLA Ashmead.
Journ. New York. Ent. Soc., vol. 7, 1899, p. 57.
Haplotype: *Mutilla (Sphaerophthalma) gorgon* Blake.

DIMORPHOMUTILLA Ashmead.
Can. Ent., vol. 35, 1903, p. 325.
Haplotype: *Mutilla lunulata* Spinola.

DOLICHOMUTILLA Ashmead.
Journ. New York Ent. Soc., vol. 7, 1899, p. 55.
Haplotype: *Mutilla guineensis* Fabricius.

EDRIONOTUS Radoszkowski.
Horae soc. ent. Ross., vol. 19, 1885, p. 33.
Proposed to include 7 species.
Logotype: *Mutilla capitata* Lucas: Ashmead, Can. Ent., vol. 35, 1903, p. 332.
Synonym of *Myrmilla* Wesmael according to André, Gen. Ins., vol. 1, fasc. 11, 1903, p. 24.

EPHUTA Say.
Bost. Journ. Nat. Hist., vol. 1, 1836, p. 297.
Proposed as a subgenus of *Mutilla* to include 3 species.
Logotype: *Mutilla (Ephuta) scrupea* Say; Ashmead, Journ. New York Ent. Soc., vol. 7, 1899, p. 57.

EPHUTOMMA Ashmead.
  Journ. New York Ent. Soc., vol. 7, 1899, p. 52.
  Haplotype: *Mutilla incerta* Radoszkowski.

EPHUTOMORPHA André.
  Gen. Ins., vol. 1, fasc. 11, 1903, p. 48.
  Proposed to include 117 species.
  Orthotype: *Mutilla aurata* Fabricius.

EPHUTOPSIS Ashmead.
  Can. Ent., vol. 36, 1904, p. 6.
  Proposed to include two species both of which are designated as types.
  Orthotype: *Mutilla odontophora* Cameron.
  Pseudotype: *Ephutopsis trinidadensis* Ashmead. Invalid because species was never described.

EURYMUTILLA Ashmead.
  Journ. New York Ent. Soc., vol. 7, 1899, p. 56.
  No species originally included.
  Logotype: *Mutilla affinis* Westwood; Ashmead, Can. Ent., vol. 35, 1903, p 307.

EUSPINOLIA Ashmead.
  Can. Ent., vol. 35, 1903, p. 325.
  Haplotype: *Mutilla chilensis* Spinola.

GLOSSOTILLA Bischoff.
  Archiv. f. Naturg., vol. 86, Abt. A, 1920, p. 454.
  Proposed to include many species.
  Orthotype: *Mutilla suavis* Gerstaecker.

HADROTILLA Bischoff.
  Archiv. f. Naturg., vol. 86, Abt. A, 1920, p. 243.
  Haplotype: *Mutilla helle* Peringuey.

HOPLOMUTILLA Ashmead.
  Journ. New York Ent. Soc., vol. 7, 1899, p. 57.
  Haplotype: *Mutilla spinosa* Swederus.
  Pseudotype: *Mutilla cephalotes* Swederus; Ashmead, Can. Ent., vol. 36, 1904, p. 7. Invalid because type correctly designated in original reference.

KONOWIELLA André.
  Bull. soc. ent. France, 1909, p. 107.
  Haplotype: *Konowiella hirticornis* André.
  Synonym of *Plumarius* Philippi according to Bradley, Journ. Wash. Acad. Sci., vol. 11, 1921, p. 214.

LABIDOMILLA André.
  Gen. Ins., vol. 1, fasc. 11, 1903, p. 26.
  Proposed to include 3 species.
  Logotype: *Mutilla tauriceps* Kohl; Ashmead, Can. Ent., vol. 35, 1903, p. 325.

LEUCOSPILOMUTILLA Ashmead.
  Can. Ent., vol. 35, 1903, p. 310.
  Haplotype: *Mutilla cerberus* Klug.

LIOMUTILLA André.
  Zeitschr. f. Hymen. & Dipt., vol. 7, 1907, p. 340.
  Haplotype: *Liomutilla canariensis* André.

LIOTILLA Bischoff.
  Archiv. f. Naturg., vol. 86, Abt, A, 1920, p. 76.
  Haplotype: *Liotilla laevis* Bischoff.

LOBOTILLA Bischoff.
Archiv. f. Naturg., vol. 86, Abt, A, 1920, p. 334.
Proposed to include 5 species.
Orthotype: *Mutilla leucopyga* Klug.

LOPHOTILLA Bischoff.
Archiv. f. Naturg., vol. 86, Abt, A, 1920, p. 303.
Proposed to include 10 species.
Orthotype: *Mutilla ciliaticornis* André.

MICROMUTILLA Ashmead.
Journ. New York Ent. Soc., vol. 7, 1899, p. 59.
Haplotype: *Photopsis nanus* Ashmead.

MIMECOMUTILLA Ashmead.
Can. Ent., vol. 35, 1903, p. 327.
Haplotype: *Mutilla purpurata* Smith.
Pseudotype: *Mimecomutilla renominanda* Bischoff. See discussion by Bradley and Bequaert, Rev. zool. Africains, vol. 12, 1923, pp. 227–228.

MORSYMA Fox.
Trans. Amer. Ent. Soc., vol. 25, 1899, p. 287.
Haplotype: *Morsyma Ashmeadii* Fox.

MUTILLA Linnaeus.
Syst. Nat., ed. 10, vol. 1, 1758, pp. 343 and 582.
Originally included 8 species.
Logotype: *Mutilla europaea* Linnaeus: Latreille, Consid. gênér. sur l'ordre nat. des animaux composant les classes des Crustaces, des Arachnids et des Insectes, 1810, p. 437.
For discussions regarding the fixation of the type for this genus see Morice and Durant, Trans. Ent. Soc. Lond., 1914, pp. 429–430, and Bradley, Trans. Ent. Soc. Lond., 1919, p. 71.

MYRMILLA Wesmael.
Bull. Acad. Roy. Sci. Belgique, vol. 18, 1851, p. 365.
Proposed to include 2 species.
Logotype: *Mutilla distincta* Lepeletier; Ashmead, Can. Ent., vol. 35, 1903, p. 324. (*M. incompleta* Lepeletier, one of the species originally included is a synonym of *M. distincta* Lepeletier according to authors.)

MYRMILLOIDES André.
Gen. Ins., vol. 1, fasc. 11, 1903, p. 26.
Haplotype: *Mutilla grandiceps* Blake.

MYRMOTILLA Bischoff.
Archiv. f. Naturg., vol. 86, Abt. A, 1920, p. 84.
Haplotype: *Mutilla lucasi* Sichel and Radoszkowski.

NANOMUTILLA André.
Spec. Hymen. d'Eur. & d'Alg., vol. 8, 1901, pp. 130 and 223.
Proposed as a subgenus of *Mutilla*.
Haplotype: *Mutilla vaucheri* Tournier.

NEOMUTILLA Reed.
Revista Chilena, vol. 2, 1898, p. 1.
Two species originally included.
Logotype: *Mutilla attenuata* Spinola. Present designation.
Reed's paper in which he mentions this genus is not available in the United States, but I have been able to secure a transcript of it from the authorities at the British Museum, which I herewith reproduce.
"*Mutilla*, L. Gay. Historia fisica de Chile, Zool., vol. 6, pp. 270–281.
De las nueve especies descritas las siete primeras parecen pertenecer al jénero. Las mas communes son:

NEOMUTILLA Reed—Continued.

Mutilla chilensis, Spinola. Macho i hembra.

Mutilla lunata, Spinola. Hembra.

Mutilla gayi, Spinola. Hembra.

Mutilla atripennis, Spinola. Macho.

Las otros tres no he podido identificar.

Las dos últimas especies no son conjenéricas con las anteriores, el *M. attenuata* es escasa, el *M. tenuiventris* es bastante commun, al menos los machos.

Hai como mil especies de Mutílidos descritos, pero no existe en Chile obra alguna moderna sobre la familia, asi que no sé si hai un jénero descrito que incluya estas dos especies o si seria conveniente hacerlas un jénero nuevo. En mi coleccion existen con el nombre MS. de Neomutilla."

NEOPHOTOPSIS Ashmead.

Can. Ent., vol. 35, 1903, p. 306.

Haplotype: *Mutilla pluto* Fox.

NOMIAEPHAGUS Ashmead.

Journ. New York Ent. Soc., vol. 7, 1899, pp. 56 and 59.

Haplotype: *Mutilla (Sphaerophthalma) sanbornii* Blake.

Synonym of *Pseudomethoca* according to Mickel, Proc. U. S. Nat. Mus., vol. 64, Art. 15, 1924, p. 5.

ODONTOMUTILLA Ashmead.

Journ. New York Ent. Soc., vol. 7, 1899, p. 55.

Haplotype: *Odontomutilla abbottii* Ashmead mss. *Mutilla saussurei* Sichel and Radoszkowski, according to André, Zeitschr. f. Hymen. & Dipt., vol. 1, 1901, p. 329.

ODONTOPHOTOPSIS Viereck.

Proc. Acad. Nat. Sci. Phila., vol. 54, 1902, p. 738.

Proposed to include 3 new species.

Orthotype: *Odontophotopsis exogyrus* Viereck.

ODONTOTILLA Bischoff.

Archiv. f. Naturg., vol. 86, Abt. A, 1920, p. 70.

Proposed to include 3 species.

Orthotype: *Myrmilla bidentata* André.

PERINGUEYA Ashmead.

Can. Ent., vol. 35, 1903, p. 327.

Haplotype: *Mutilla erynnis* Peringuey.

Pseudotype: *Mutilla euterpe* Peringuey; Ashmead, Can. Ent., vol. 35, 1903, p. 329. Invalid because type already correctly designated.

Synonym of *Odontomutilla* according to Bischoff, Archiv. f. Naturg., vol. 86, Abt. A, 1920, p. 245.

PHOTOMORPHUS Viereck.

Ent. News, vol. 14, 1903, p. 249.

Proposed to include 2 species.

Orthotype: *Photomorphus johnsoni* Viereck.

PHOTOPSIS Blake.

Trans. Amer. Ent. Soc., vol. 13, 1886, p. 179.

Logotype: *Agama imperialis* Blake; Ashmead, Journ. New York Ent. Soc., vol. 7, 1899, p. 60.

New name for *Agama* Blake, preoccupied in Reptilia.

PLATYMYRMILLA André.

Spec. Hymen. d'Eur. & d'Alg., vol. 8, 1900, pp. 130 and 220.

Proposed as a subgenus of *Mutilla*.

Haplotype: *Mutilla quinquefasciata* Olivier.

PRISTOMUTILLA Ashmead.

Can. Ent., vol. 35, 1903, p. 329.

Haplotype: *Mutilla pectinata* Radoszkowski.

PROMECILLA André.

Gen. Ins., vol. 1, fasc. 11, 1903, p. 30.

Proposed to include 9 species, with 2 others doubtful.

Orthotype: *Mutilla regia* Smith.

PSAMMOTHERMA Latreille.

Fam. nat. du Regne Animal, 1825, p. 453.

In: Cuvier's, Le Regne Animal, vol. 5, 1829, p. 315.

Haplotype: *Mutilla flabellata* Fabricius.

Latreille proposed this genus in 1825 in his Fam. nat. du Regne Animal, but did not include any species. Later, in 1829, in vol. 5 of Cuvier's Le Regne Animal, of which Latreille was the author of vols. 4 and 5, he included one species. Lepeletier refers to this latter work in his Hist. nat. des Insectes, Hymenopteres, vol. 3, p. 592. Both Dalle Torre and André misinterpreted this reference and cited a different work of an earlier date for the erection of this genus, namely, Hist. nat. Crust. et Insectes, vol. 2, 1802, p. 315. This of course was an error and has been noted by Bischoff, Archiv. f. Naturg., vol. 86, Abt. A, 1920, p. 711. The genus should date from 1829 because no species were indicated in the work of 1825.

PSEUDOCEPHALOTILLA Bischoff.

Archiv. f. Naturg., vol. 86, Abt. A, 1920, p. 514.

Proposed to include 4 species.

Orthotype: *Pseudocephalotilla beirana* Bischoff.

PSEUDOMETHOCA Ashmead.

Trans. Amer. Ent. Soc., vol. 23, 1896, p. 181.

Haplotype: *Photopsis cressonii* Fox=*Mutilla* (*Sphaerophthalma*) *canadensis* Blake.

PSEUDOMUTILLA Costa.

Rend. accad. Sci. Fis. Mat. Napoli, vol. 23, 1885, p. 169.

Atti accad. Sci. Fis. Mat. Napoli, ser. 2, vol. 1, pt. 13, 1885, p. 17.

Haplotype: *Pseudomutilla sardiniensis* Costa=*capitata* Lucas according to Costa, Atti accad. Sci. Fis. Mat. Napoli, ser. 2, vol. 3, pt. 1, 1888, p. 107.

Synonym of *Myrmilla* according to André, Gens. Ins., vol. 1, fasc. 11, 1903, p. 24.

PSEUDOPHOTOPSIS André.

Mem. soc. zool. France, vol. 9, 1896, p. 266.

Proposed to include 5 species.

Logotype: *Agama gamarovii* Radoszkowski; Ashmead, Can. Ent., vol. 35, 1903, p. 305.

PTILOMUTILLA André.

Zeitschr. f. Hymen. & Dipt., vol. 5, 1905, p. 371.

Proposed to include 3 species.

Orthotype: *Ephuta plumifera* André.

PYCNOMUTILLA Ashmead.

Can. Ent., vol. 36, 1904, p. 8.

Haplotype: *Mutilla waco* Blake.

PYCNOTILLA Bischoff.
Archiv. f. Naturg., vol. 86, Abt. A, 1920, p. 182.
Proposed to include 31 species.
Orthotype: *Mutilla barbara* Linnaeus.
Synonym of *Ronisia* Costa because type of latter is variety of the type of *Pycnotilla*.

PYRRHOMUTILLA Ashmead.
Journ. New York Ent. Soc., vol. 7, 1899, p. 56.
Haplotype: *Sphaerophthalma anthophora* Ashmead.

RADOSZKOWSKIUS Ashmead.
Can. Ent., vol. 35, 1903, p. 327.
Haplotype: *Mutilla simplicifascia* Radoszkowski.
Synonym of *Odontomutilla* according to Bischoff, Archiv. f. Naturg., vol. 86, Abt. A, 1920, p. 245.

REEDIA Ashmead.
Can, Ent., vol. 36, 1904, p. 9.
Haplotype: *Mutilla atripennis* Spinola.

RHOPALOMUTILLA André.
Zeitschr. f. Hymen. & Dipt., vol 1, 1901, p. 323.
Proposed as subgenus of *Mutilla*.
Haplotype: *Mutilla clavicornis* André.

RHOPTROMUTILLA André.
Gen. Ins., vol. 1, fasc. 11, 1903, p. 43.
Proposed to include 64 species, with 12 others doubtful.
Orthotype: *Mutilla chrysodora* Perty.
Synonym of *Ephuta* according to Ashmead, Can. Ent., vol 36, 1904, pp. 5 and 6.

RONISIA Costa.
Fauna del Regno di Napoli; Imenotteri aculeati; Mutillidae, 1858, p. 10.
Haplotype: *Ronisia torosa* Costa=*Mutilla barbara* var. *torosa* Costa according to André, Spec. Hymen. d'Eur. & d'Alg., vol. 8, 1903, p. 459, and Bischoff, Archiv. f. Naturg., vol. 86, Abt. A, 1920, p. 198.

RUDIA Costa.
Fauna del Regno di Napoli; Imenotteri aculeati; Mutillidae, 1858, p. 7.
Proposed to include 2 species.
Logotype: *Rudia megacephala* Costa=*Mutilla erythrocephala* Latreille; Bischoff, Archiv. f. Naturg., vol. 86 Abt. A, 1920, p. 54.
Synonym of *Myrmilla* according to André, Gen. Ins., vol. 1, fasc. 11, 1903; p. 24, and Bischoff, Archiv. f. Naturg., vol. 86, Abt. A, 1920, p. 54.

SCAPTODACTYLA Burmeister.
Bol. acad. nac. ciencias Cordova, vol. 1, 1875, p. 500.
Haplotype: *Scaptodactyla heterogama* Burmeister.

SMICROMYRME Thomson.
Opuscula entomologica, fasc. 2, 1870, p. 208.
Haplotype: *Mutilla rufipes* Fabricius.

SPHAEROPHTHALMA Blake.
Trans. Amer. Ent. Soc., vol. 3, 1871, p. 232.
Proposed as a subgenus of *Mutilla* to include 84 species.
Logotype: *Mutilla* (*Sphaerophthalma*) *scaeva* Blake; Ashmead, Journ. New York Ent. Soc., vol. 7, 1899, p. 60.

SPHINCTOMUTILLA André.

Spec. Hymen. d'Eur. & d'Alg., vol. 8, 1899, pls. 2 and 7.

3 species figured in this plate.

Logotype: *Mutilla continua* Fabricius. Present designation.

Synonym of *Ephutomma* according to André, Spec. Hymen. d'Eur. & d'Alg. vol. 8, 1900, p. 136.

SPHINCTOPSIS, new name=(SPHINCTOMUTILLA André 1909, not 1899).

Ann. mus. nac. Buenos Aires, ser. 3, vol. 10, 1909, p. 178.

Proposed to include 18 species.

Orthotype: *Mutilla melanocephala* Perty. (A new name takes the same species as genotype.)

SPILOMUTILLA Ashmead.

Can. Ent., vol. 35, 1903, p. 324.

Haplotype: *Mutilla perfecta* Radoszkowski.

SPINULOTILLA Bischoff.

Archiv. f. Naturg., vol. 86, Abt. A, 1920, p. 160.

Proposed to include 17 species.

Orthotype: *Mutilla peringueyi* André.

SQUAMULOTILLA Bischoff.

Archiv. f. Naturg., vol. 86, Abt. A, 1920, p. 80.

Proposed to include 5 species.

Orthotype: *Squamulotilla denticollis* Bischoff.

STENOMUTILLA André.

Mem. soc. zool. France, vol. 9, 1896, p. 265.

Proposed as a subgenus of *Mutilla*.

Haplotype: *Mutilla argentata* Villers.

SULCOTILLA Bischoff.

Archiv. f. Naturg., vol. 86, Abt. A, 1920, p. 555.

Haplotype: *Mutilla sulcata* Magretti.

TALLIUM André.

Gen. Ins., vol. 1, fasc. 11, 1903, p. 45.

Proposed to include 7 species, with one other doubtful.

Orthotype: *Mutilla empyrea* Gerstaecker.

Pseudotype: *Mutilla tenebrosa* Gerstaecker. Invalid because type already correctly designated.

TETRAPHOTOPSIS Ashmead.

Can. Ent., vol. 35, 1903, p. 305.

Haplotype: *Mutilla hubbardi* Fox. Type is cited in original designation as *Tetraphotopsis hubbardi* Ashmead.

TILLUMA André.

Gen. Ins., vol. 1, fasc. 11, 1903, p. 52.

Proposed as a subgenus of *Ephuta* to include 24 species, with 3 others doubtful.

Orthotype: *Mutilla spinosa* Swederus.

Isogenotypic with *Hoplomutilla* Ashmead.

TIMULLA Ashmead.

Journ. New York Ent. Soc., vol. 7, 1899, p. 55.

Haplotype: *Mutilla dubitata* Smith.

TRAUMATOMUTILLA André.

Zeitschr. f. Hymen. & Dipt., vol. 1, 1901, pp. 257–258.

Proposed as a subgenus of Mutilla to include 4 species.

Orthotype: *Mutilla indica* Linnaeus; André, Gen. Ins., vol. 1, fasc. 11, 1903, p. 54.

Synonym of *Sphaerophthalma* according to Ashmead, Can. Ent., vol. 36, 1904, p. 9.

TRICHOLABIODES Radoszkowski.

Horae soc. ent. Ross., vol. 19, 1885, p. 33.

Proposed to include 2 species.

Logotype: *Mutilla pedunculata* Klug; Ashmead, Can. Ent., vol. 35, 1903, p. 305.

Mutilla pedunculata Klug=*Mutilla semistriata* Klug according to Bischoff, Archiv. f. Naturg., vol. 86, Abt. A, 1920, p. 99.

TRISPILOTILLA Bischoff.

Archiv. f. Naturg., vol. 86, Abt. A, 1920, p. 291.

Proposed to include 11 species.

Orthotype: *Mutilla africana* André.

TROGASPIDIA Ashmead.

Journ. New York Ent. Soc., vol. 7, 1899, p. 58.

Haplotype: *Mutilla medon* Smith.

TROPIDOTILLA Bischoff.

Archiv. f. Naturg., vol. 86, Abt. A, 1920, p. 155.

Proposed to include 7 species.

Orthotype: *Mutilla littoralis* Petagna.

VIERECKIA Ashmead.

Can. Ent., vol. 35, 1903, p. 324.

Haplotype: *Mutilla dumbrodia* Peringuey.

XENOMUTILLA Ashmead.

Can. Ent., vol. 35, 1903, p. 330.

Haplotype: *Mutilla eurydice* Peringuey.

XYSTROMUTILLA André.

Zeitschr. f. Hymen. & Dipt., vol. 5, 1905, p. 374.

Proposed to include a single species, with 2 others doubtful.

Logotype: *Xystromutilla asperiventris* André. Present designation.

PART 3

MONOGRAPH OF THE MUTILLID WASPS OF THE GENUS DASYMUTILLA OCCURRING IN AMERICA, NORTH OF MEXICO

INTRODUCTION

The genus *Dasymutilla* is represented in North America, north of Mexico, by more species than any other genus of the family Mutillidae, with the possible exception of one or two genera which are more or less nocturnal in habits and concerning which we as yet know very little. One hundred forty-two species and varieties are known at the present time in North America, north of Mexico. Many more species of this genus are to be found in Mexico and Central America so that the genus is really a very large one. This number of course may be somewhat reduced when the sexes of all the species are correlated. The genus includes a number of species which are commonly met with, one of the largest, *D. occidentalis* (Linnaeus), having received the popular name of " Cowkiller."

The material which forms the basis of this study is the largest collection of specimens ever assembled of a single genus of this family. Such an assemblage of material was made possible by the helpful and hearty cooperation of many persons, acknowledgment of which is made elsewhere. Approximately 10,000 specimens have been examined individually during the course of the work, each specimen receiving the same care and precision in its determination, and a determination label being attached to every specimen. While this has added enormously to the amount of time and labor necessary to complete the task, the advantages have been very definite. Many errors have been eliminated in this way that would otherwise have passed unnoticed, and considerable information gained that would have been overlooked in a less intensive study.

BIOLOGY

The host relationships are known for only a few species of *Dasymutilla*. *D. quadriguttata* (Say) and *D. permista* Mickel have been reared from *Elis quinquecincta* Fabricius according to Hayes (1924). *D. bioculata* (Cresson) has been reared from *Bembix pruinosa* Fox and *Microbembex monodonta* Say by the writer (1924). *D. fulvohirta* (Cresson) has been reared from the cells of *Anthophora occidentalis* (Cresson) by Dr. Francis Long and the remains of

D. fulvohirta found in the cells of the same bee by Mr. Charles H. Hicks. The latter also found the remains of *D. asopus* (Cresson) in the cells of *Dianthidium* species. *D. vesta* (Cresson) is said by Rucker (1903) to have been reared from *Chalybion caeruleum* (Linnaeus), but there is some doubt as to whether the Mutillid was correctly identified. More recent rearings from this host have always produced *Sphaerophthalma* species as the parasite. The writer has not been able to obtain the specimens reared by Rucker in order to verify the determination so that the relationship can not be regarded as definitely established. *D. foxi* (Cockerell) is reported by Cockerell (see remarks on this species) to be parasitic in the nests of *Diadasia* species.

SPECIFIC CHARACTERS

The species of *Dasymutilla* do not lack characters by which they may be distinguished from one another, although many of them appear superficially to be almost indistinguishable. Many of the characters are superspecific; that is, the same character is present in two or more species. It is therefore possible to arrange the species in groups, the units of each group bearing a close relationship to one another. The superspecific characters are as follows: Presence or absence of a median pit densely filled with erect hairs on the second abdominal sternite of the males, presence or absence of a median longitudinal row of erect hairs, simulating a carina, on the second abdominal sternite of the males; presence or absence of an apical fringe of hairs on the last tergite of the males; structure of the male genitalia; presence or absence of a prominent tooth on the posterior trochanters of the males; size of the ocelli and the eyes in the males; structure of the posterior tibiae in the males; structure of the apex of the intermediate and posterior femora in both the males and the females; size of the eyes in the female; presence or absence of tubercles at the postero-lateral angles of the head in the females; shape of the thorax in the females; and the presence or absence of a scutellar scale in the females. Specific characters are as follows: Relative lengths of the first and second segments of the flagellum; relative widths of the head and thorax; sculpture of the various sclerites of the body; color of the integument and the pubescence, including maculations of the body due to both; presence or absence of a carina bounding the antennal scrobes above; presence or absence of a median emargination of the pronotum of the males; shape and sculpture of the tegulae of the males; color of the calcaria of the males; sculpture of the genae of the females and sculpture of the pygidium of the females.

The genitalia of the males have proved of inestimable value in settling certain points, especially in groups of males that are superficially very much alike. It has been possible to determine that certain external characters were of specific value by using the genitalia as a criterion. On the other hand certain groups of males quite different in superficial appearance possess genitalia which are practically identical, so that these structures have been of assistance not only in the distinguishing of species, but also in determining the relationships of species, which is exceedingly important from the viewpoint of phylogeny.

Figures of the genitalia have been drawn and are reproduced herewith on the following scale: 1 mm. in the drawing equals 0.039 mm. in the genitalia itself. Where several species have the genitalia identical in form, a figure of those of only one species is given.

CLASSIFICATION

The 142 species and varieties of the genus *Dasymutilla* may be divided into groups, the components of which bear a close relationship to one another. Most of these groups are natural ones, but several contain species which are included merely as a matter of convenience, while the last three are purely artificial, including males, the relationships of which are not understood at the present time. The group *asopus* is a natural one, corresponding to Fox's (1899) groups, *waco* and *asopus* combined. The group *fulvohirta* includes the species *fulvohirta* and other closely related species. The species *cotulla* is placed here because the male genitalia and the shape of the last abdominal sternite are like those of the other males in this group, although it differs from those by having a well-developed median pit on the second abdominal sternite. The group *thetis* includes one species which presents a combination of characters unlike those of any other group. The groups *scabra* and *foxi* are natural groups composed of closely related species. The species included in the group *sparsa* form a natural group for the most part; there is, however, some question as to whether *macra* should be placed there. The group *vesta* is composed of one species with its varieties and a second species known only in the male sex which may possibly prove to be only a variety. In the group *zelaya*, the species *zelaya* and *myrice* are very closely related, and the species *clytemnestra* and *coccineohirta* are very closely related; the relationship between the two pairs of species is much more distant. The group *bioculata* is composed of the species *bioculata* and very closely related species, except that *melanippe* and its variety and *lauta* do not show these relationships so clearly. The first eleven species of the group *quadriguttata* form a natural closely related group, but the last eight species are included on account of the presence of tubercles on the postero-lateral angles of the head, although the tubercles are quite different from those found in the first eleven species. This makes the group more or less artificial. *Rugulosa* is included in the group *quadriguttata* but the tubercles on the postero-lateral angles of the head are much reduced and not easily seen when the head is in certain positions. Likewise the species *caneo* is placed in the group *caneo* because the tubercles on the postero-lateral angles of the head are so rudimentary that they are seen with difficulty. There is then a close connection between *rugulosa* in the *quadriguttata* group and the species of the *caneo* group. There is little doubt that when the sexes are correlated that the groups *quadriguttata*, *castor*, *caneo*, and *monticola* will need to be rearranged, since all are composed entirely either of females or males. The group *occidentalis* contains several species such as *gorgon*, *leda aureola* and its variety, and *sicheliana*, which depart considerably from the general type of the group. The group *nogalensis* contains two closely related species combining characters of both the groups *occidentalis* and *obscura*. The group *obscura* is quite distinct and composed of very closely related species. The females in the group *arenivaga* are closely related and with respect to the eyes very different from the other members of the genus. The group *subhyalina* may represent the males of the previous group.

It should not be inferred that these groups are arranged in their proper phylogenetic sequence although an effort has been made to approach such an arrangement. Since only the species north of Mexico have been studied, there are many elements lacking which make it impossible to form a correct conception of the genus as a whole. In addition to this there is the fact that a considerable number of species are known only in one sex. The author does not believe that any satisfactory phylogenetic study of the genus can be made until these difficulties are overcome. Considerable advance has been made, however, toward an arrangement which places closely related species in proximity to one another, and this will surely contribute toward a better understanding of the genus as well as assist in the identification of material.

HISTORY AND DIAGNOSIS OF GENUS

Genus DASYMUTILLA Ashmead

Ephuta Say (in part), (not authors) Boston Journ. Nat. Hist., vol. 1, 1836, p. 297.—André, Gen. Ins., vol. 1, fasc. 11, 1903, p. 51.

Sphaerophthalma Blake (part), (not authors) Trans. Amer. Ent. Soc., vol. 3, 1871, p. 232.

Dasymutilla Ashmead, Journ. New York Ent. Soc., vol. 7, 1889, p. 57; Can. Ent., vol. 36, 1904, p. 9.—Bradley, Trans. Amer. Ent. Soc., vol. 42, 1916, pp. 191, 312, 321.—Rohwer, Hymen. Conn., 1916, p. 623.—Mickel, 19th Rept. State Ent. Minn., 1923, p. 101.

Bruesia ASHMEAD, Can. Ent., vol. 35, 1903, p. 306.
Pycnomutilla ASHMEAD, Can. Ent., vol. 36, 1904, p. 8.
Haplotype.—*Mutilla* (*Sphaerophthalma*) *gorgon* Blake.

The first species to be described in this genus was *occidentalis* Linnaeus, the first species mentioned by Linnaeus in his tenth edition of the Systema Naturae. The genus was first recognized by Say. He proposed *Ephuta* in 1836 as a subgenus of *Mutilla* and included three species. Two genera were represented in these three species; *erythrina* and *gibbosa* representing one and *scrupea* representing the other. Say's description of the genus applies to the first two, since he says "Eyes entire or emargination obsolete." Unfortunately, perhaps, Ashmead (1899) designated *scrupea* as the type of the genus *Ephuta*, because that was the only one of the three species that he knew in both sexes, and thereby gave the genus an entirely different meaning than that indicated in Say's diagnosis. André (1903*a*) did not accept Ashmead's designation of type nor his definition of the genus *Ephuta*, so that his *Ephuta* is synonymous with *Dasymutilla* Ashmead.

Blake (1871) was the next to recognize this group as having subgeneric rank at least, and proposed *Sphaerophthalma* as a subgenus of *Mutilla* to include those species with circular, convex, polished eyes. He later (1886) elevated *Sphaerophthalma* to the rank of genus. He included 84 species in this section and his conception of the group as expressed in his description of it was identical with that described by Say. Ashmead chose the first species listed when he designated a type in 1899, making *Mutilla* (*Sphaerophthalma*) *scaeva* Blake the type. While this species has circular, convex, polished eyes, it is not congeneric with the majority of the remaining species included, so that as defined by Ashmead it is a valid genus very different from *Dasymutilla* and quite different from Blake's original conception.

Since Ashmead's designation of types for both *Ephuta* and *Sphaerophthalma* were made correctly according to the International Rules of Nomenclature, the genera now stand as valid with limits as defined by him, and so limited are not synonymous with *Dasymutilla* in any sense of the word.

Fox (1899) returned all the species placed by Blake in the genus *Sphaerophthalma* to *Mutilla* and most of them were arranged in his groups "*waco*," "*asopus*," and "*occidentalis*."

Dasymutilla was proposed as a genus by Ashmead in 1899 with *Mutilla* (*Sphaerophthalma*) *gorgon* Blake as the type. Ashmead's definition of the genus is as follows:

> Abdomen with the first segment petiolate or petioliform, never broadly sessile with the second, but much narrowed at the apex, and usually with a constriction or furrow between it and the second; eyes rounded or hemispherical, very

prominent and highly polished, not faceted, or the facets very indistinctly defined, as in the tribe *Photopsidini;* males winged; front wings with two cubital cells; body usually very hairy or pubescent; second abdominal segment of male usually black or unicolorous, not spotted with red or yellow; second abdominal segment of female usually black or the derma not spotted, although the segment is sometimes spotted with two or more pubescent spots.

This diagnosis limits the genus to those species which have the body clothed with long and dense pubescence. A study of such species as *agenor* Fox, *gibbosa* Say, *macra* Cresson, and many others has convinced the writer that there is no valid basis at present for considering them other than as congeneric with *gorgon* Blake, the type of *Dasymutilla.* The same statement holds true for the females *quadriguttata* Say, *bioculata* Cresson, *sparsa* var. *segregata* Rohwer, and many others.

The genus *Bruesia* was proposed by Ashmead (1903–04) with *Mutilla harmonia* Fox as the type. Ashmead separated this genus from *Dasymutilla* on account of the subsessile condition of the first abdominal segment. The inconsistencies of Ashmead's classification have already been pointed out by Bradley (1916*a*). The male of *harmonia* is unknown, although Ashmead indicated the male characters in his diagnosis of the genus. *Mutilla harmonia* is considered by the writer to belong to the genus *Dasymutilla* and *Bruesia* therefore becomes a synonym of that genus.

The genus *Pycnomutilla* was proposed by Ashmead (1903–04) with *Mutilla waco* Blake as type, and was characterized principally by the rudimentary wings of the male. Bradley (1916*c*) called attention to the fact that *waco* was not generically different from *bexar* which would fall in *Bruesia.* The male of *waco* was described by Fox (1899) from a unique specimen supposed to have rudimentary wings. I have regarded this specimen as an abnormality, since other specimens with normal wings and identical with Fox's specimen in every other respect were before me for study. *Waco*, the type of *Pycnomutilla*, and *harmonia*, the type of *Bruesia*, constituted Fox's group "*waco.*" It seems to the writer that *Pycnomutilla* must be considered strictly as a synonym of *Bruesia*, and as such also becomes a synonym of *Dasymutilla.*

As limited in this paper, the diagnostic characters of the genus *Dasymutilla* are as follows:

Eyes round, prominent, almost hemispherical in shape, polished, the facets usually very indistinct but not necessarily so; first abdominal segment either distinctly petiolate, subpetiolate, or subsessile, but never completely sessile with the second, a distinct constriction present at the junction of these two segments; anterior wings of the male with cells 1st R_1+R, and R_5 present, cell R_4 either indistinct or completely absent; females with a distinct pygidial area; body either clothed with long dense pubescence, sparsely pubescent or almost bare; pubescence of the body composed entirely of simple hairs; plumose hairs never present.

KEY TO THE SPECIES

Females

1. Apices of middle and hind femora squarely truncate, the surface of the outer lobe of the truncation sulcate............85.
   Apices of middle and hind femora more or less rounded, not modified as above............2.
2. Dorsum of thorax longer than broad by actual measurement, usually very distinctly longer than broad............19.
   Dorsum of thorax as broad, sometimes slightly broader than it is long, by actual measurement............3.
3. Entire body and legs clothed with ivory-white pubescence......**thetis** (p. 78).
   Pubescence of body and legs colored otherwise............4.
4. Second abdominal sternite scabrous at the sides and apex............5.
   Second abdominal sternite not at all scabrous; punctate............7.
5. Pubescence of abdominal tergites 2–5 concolorous............6.
   Apical fringe of tergite two, and pubescence of tergite 3 entirely, black. **furina** (p. 82).
6. Metapleura, propodeum, first abdominal tergite, and basal margin of second tergite sparsely clothed with black hairs............**eminentia** (p. 79).
   Entire insect clothed with pale pubescence, except basal median spot of second tergite, black............**scabra** (p. 79).
7. Head distinctly broader than the thorax............8.
   Head narrower than the thorax............9.
8. Carina of first sternite produced anteriorly into a blunt tooth; area of golden yellow pubescence on abdomen above with an anterior median emargination............**aureola** (p. 251).
   Carina of first sternite prominent but not produced into a tooth anteriorly; area of scarlet pubescence on abdomen above without an anterior median emargination............**aureola** var. **pacifica** (p. 253).
9. Antennal scrobes carinate above............10.
   Antennal scrobes not carinate above............13.
10. Thorax with a distinct scutellar scale; pygidium longitudinally rugose; vestiture white and black............**nocturna**, (p. 279).
    Thorax without a scutellar scale; pygidium irregularly rugose; no white pubescence in the vestiture............11.
11. Head and thorax entirely black............**zelaya** (p. 120).
    Pubescence of head and thorax ferruginous............12.
12. Pubescence of tergites 3–5 black, at least laterally............**homole** (p. 72).
    Pubescence of tergites 3–5 entirely bright red to yellow...**fulvohirta** (p. 66).
13. Mandibles bidentate, that is, acute at the apex, unidentate on the inner margin............17
    Mandibles tridentate, that is, acute at the apex, bidentate subapically on the inner margin............14.
14. Head and thorax black............**waco** (p. 63).
    Head and thorax ferruginous............15.
15. Pubescence of abdomen beneath black............16.
    Pubescence of abdomen beneath pale............**harmonia** (p. 56).
16. Apical fringe of tergite 2 entirely black, pubescence of tergites 3–5 entirely black............**nigricauda** (p. 64).
    Apical fringe of tergite 2 pale medially and laterally, tergite 3 mostly pale, tergites 4 and 5 pale, except for erect, dark hairs...**montivagoides** (p. 64).

17. Pubescence of dorsums of thorax and abdomen concolorous---------18.
Pubescence of dorsum of thorax whitish, with scattered, erect, black hairs; a triangular black spot of black pubescence anteriorly and posteriorly, the latter not as conspicuous as the former; pubescence of second tergite scarlet---------**dugesii** (p. 87).
18. Pubescence of body above, principally scarlet---------**foxi** (p. 84).
Pubescence of body above whitish, slightly tinged with yellow. **phoenix** (p. 85).
19. Entire insect clothed with long, coarse, white hairs---------20.
Pubescence of body and legs colored otherwise---------21.
20. Pygidium irregularly rugose; color of body and legs red; genae rounded posteriorly---------**gloriosa** (p. 242).
Pygidium prominently longitudinally striate; color of body and legs blackish; genae bounded posteriorly by an obscure carina-**pseudopappus** (p. 243).
21. Pygidium pubescent---------**bollii** (p. 277).
Pygidium not pubescent---------22.
22. Scutellar scale evident, usually prominent---------29.
Scutellar scale entirely absent---------23.
23. Genae not as coarsely punctured as the front and vertex, rounded at the posterior margin---------24.
Genae very coarsely punctured like the front and vertex, the posterior margins defined by a distinct carina; pubescence brilliant crimson. **fulgida** (p. 76).
24. Pubescence of abdominal tergites 2–5 concolorous, rather dense, and erect-25.
Pubescence of abdominal tergites 2–5 not concolorous, sparse---------26.
25. Pubescence of head and thorax black, that of the abdomen fulvous. **nupera** (p. 103).
Pubescence of front, vertex, thorax above, and abdomen above concolorous, ochraceous---------**stevensi** (p. 99).
26. Second abdominal tergite with very large, separated, foveate punctures, each bearing an erect hair; no other pubescence on disk of second tergite. **dionysia** (p. 104).
Second abdominal tergite with close, large elongate punctures; the pubescence of the second tergite mostly recumbent---------27.
27. Apical fringes of first and second abdominal tergites entirely pale. **texanella** (p. 96).
Apical fringes of first and second abdominal tergites in part pale---------28.
28. Lateral extremes and median spot of apical fringe of second abdominal tergite silvery, the interspaces black---------**sparsa** (p. 88).
Only lateral extremes of apical fringe of second tergite silvery; remainder of apical fringe black---------**sparsa** var. **segregata** (p. 93).
29. Postero-lateral angles of the head prominent; conspicuously carinate or tuberculate---------30.
Postero-lateral angles of the head not prominent; not conspicuously carinate or tuberculate---------47.
30. Head, thorax, and abdomen clothed above with long, dense, erect pubescence---------31.
Head, thorax, and abdomen above with sparse, appressed pubescence---------32.
31. Pubescence of second tergite, except basal fourth, and third tergite entirely, yellow---------**californica** (p. 181).
Apical margin of second tergite medially, and third tergite medially, with black pubescence---------**californica** var. **clio** (p. 184).

32. Antennal scrobes bounded caudally by a delicate carina--cariniceps (p. 185).

Antennal scrobes not bounded caudally by a carina--------------------33.

33. Postero-lateral angles of the head bearing an oblique, elongate, subparallel-sided, glabrous tubercle directed outward toward the eyes------------34.

Postero-lateral angles of the head bearing a more or less prominent glabrous tubercle, but either broadly triangular or subreniform in outline------44.

34. Thorax black--wileyae (p. 177).

Thorax ferruginous--35.

35. Head black, clothed more or less with ferruginous pubescence-----------36.

Head entirely ferruginous---37.

36. Abdomen entirely black---------------------------------electra (p. 176).

Second abdominal tergite with a pair of conspicuous pale yellow spots on the apical half-------------------------------------nitidula (p. 174).

37. Abdomen largely black, the second tergite maculated with two or four pale yellow spots---38.

Abdomen largely ferruginous, the second tergite more or less conspicuously maculated with four pale ferruginous spots------------------------41.

38. Second tergite with only two pale spots-------------------------------39.

Second tergite with four pale spots-----------------------------------40.

39. Dorsal part of posterior face of propodeum with a thick brush of long, coarse hairs; distance between the tubercles on posterior margin of head much greater than the least distance between the inner margin of the eyes---curticeps (p. 173).

Propodeum without any such brush of hairs; distance between the tubercles on posterior margin of the head equal to the least distance between the inner margins of the eyes------------------------------biguttata (p. 171).

40. Apical fringes of first, second, and third abdominal tergites black. atrifimbriata (p. 169).

Apical fringes of all the abdominal tergites silvery---quadriguttata (p. 157).

41. Apical fringes of first, second, and third tergites black; subapical margin of second tergite, and third tergite entirely (except narrow lateral margins of each), clothed with black pubescence-------------------alesia (p. 168).

Apical fringes of all the tergites mostly pale; occasionally the apical fringe of the first tergite black, or apical fringes of second and third tergites narrowly interrupted medially-------------------------------------42.

42. Posterior margin of the head slightly concave, somewhat sinuate, the postero-lateral angles very prominent------------------cypris (p. 165).

Posterior margin of the head distinctly convex, the postero-lateral angles somewhat prominent---43.

43. Striae of pygidium continuing to the apical margin----interrupta (p. 160).

Striae of pygidium terminating considerably before the apical margin, the apical fourth or fifth smooth, unsculptured-------------allardi (p. 166).

44. Dorsal and posterior face of propodeum strongly asperated. chattahoochei (p. 186).

Dorsal and posterior face of propodeum foveolate or coarsely rugose----45.

45. Apical fringe of first and second abdominal tergites black; posterior face of propodeum either almost bare, or with a thin brush of golden pubescence--46.

Apical fringe of first tergite silvery; that of the second tergite black medially; posterior face of propodeum with a thick brush of silvery pubescence---corcyra (p. 180).

46. Pubescence of third abdominal tergite black, except extreme lateral margins silvery; posterior face of propodeum with a thin brush of golden pubescence--**campanula** (p. 178).
    Pubescence of third abdominal tergite entirely silvery; posterior face of propodeum with only sparse, scattered pubescence----**anguliceps** (p. 178).
47. Antennal scrobes strongly carinate above, the carina extending from the antennal tubercles almost to the margins of the eyes----------------72.
    Antennal scrobes weakly carinate, or not at all carinate above; if weakly carinate, the carina extends a little more than half the distance from the antennal tubercles to the margins of the eyes------------------------48.
48. Antennal scrobes feebly carinate above, the carina extending a little more than half the distance between the antennal tubercles and the eyes---49.
    Antennal scrobes not at all carinate above------------------------------52.
49. Segments 3–10 of the flagellum broadly, deeply, longitudinally sulcate dorsally--**sulcatulla** (p. 155).
    Flagellar segments, all normal, not sulcate-------------------------------50.
50. Pygidium rugose; dorsal areas of head, thorax, and abdomen clothed with long, dense, erect, scarlet pubescence--------------**flammifera** (p. 240).
    Pygidium distinctly longitudinally striate; pubescence not scarlet------51.
51. Pubescence of head and thorax black, not concolorous with that of the abdomen--**melanippe** (p. 152).
    Pubescence of vertex and dorsum of thorax orange rufous, concolorous with that of the abdomen------------------**melanippe** var. **conformis** (p. 153).
52. Pygidium irregularly rugose--53.
    Pygidium longitudinally striate--54.
53. Pubescence of body above white--------------------**clytemnestra** (p. 126).
    Pupescence of body above varying from light yellow to red.
    coccineohirta (p. 124).
54. Head wider than the thorax---55.
    Head sometimes almost as wide, but not wider than the thorax---------56.
55. Head and thorax with black pubescence; abdomen with red pubescence.
    gorgon (p. 247).
    Head, thorax, and abdomen with yellowish pubescence-----**leda** (p. 249).
56. Pubescence of abdominal tergites 2–5 concolorous; pubescence of head and thorax entirely black------------------------------------**lauta** (p. 154).
    Pubescence of abdominal tergites 2–5 not concolorous; pubescence of head and thorax colored otherwise--57.
57. Posterior face of propodeum conspicuously clothed with silvery or very pale golden pubescence--67.
    Posterior face of propodeum either almost bare, or clothed with ferruginous or yellow pubescence---58.
58. Postero-lateral angles of head angulate; posterior face of propodeum deeply, coarsely foveolate, almost bare----------------------**rugulosa** (p. 187).
    Postero-lateral angles of head rounded, not at all angulate--------------59.
59. Abdominal sternites clothed with black pubescence----------------------60.
    Abdominal sternites clothed with pale silvery pubescence---------------61.
60. Disk of second abdominal tergite with large, close elongate punctures; dorsum of thorax and abdomen with sparse, mostly appressed pubescence.
    praegrandis (p. 148).
    Disk of second abdominal tergite with moderate, distinct, irregular punctures; dorsum of thorax and abdomen with moderately dense, erect, and appressed pubescence------------------------------------**creusa** (p. 140).

61. Pubescence of abdominal tergites 3–5 entirely black, except narrow lateral margins silvery----------------------------**creusa var. bellona** (p. 142).
Pubescence of abdominal tergites 3–5 not entirely black; either broad lateral margins of tergites 3–5, tergites 3–5 entirely, or tergites 4–5 entirely pale---62.

62. Pubescence of dorsal areas of head, thorax, and abdomen, sparse and appressed; pubescence of apical margin of second abdominal tergite black--63.
Pubescence of dorsal areas of head, thorax, and abdomen long, dense, and erect; pubescence of apical margin of second tergite ferruginous, the apical fringe whitish, interrupted medially with black------------------
ursula (p. 143).

63. Dorsum of thorax with a transverse, sinuate carina immediately anterior to the scutellar scale; carina of first abdominal sternite produced anteriorly into a prominent tooth---64.
Dorsum of thorax without a transverse, sinuate carina; only scutellar scale present; carina of first sternite usually bidentate---------------------65.

64. Pubescence of abdominal tergites 3–5 silvery; apical margin of second tergite black, sometimes interrupted medially by a spot of silvery pubescence.
lepeletierii (p. 132).
Pubescence of abdominal tergites 4–5 silvery, apical margin of second tergite, and third tergite entirely black----------------**bioculata** (p. 126).

65. Apical fringe of first abdominal tergite silvery; that of the second tergite silvery, narrowly interrupted medially with black---------------------66.
Apical fringes of first and second abdominal tergites largely black; broad apical margin of second tergite black-------------------**vesta** (p. 105).

66. Front deeply, confluently punctate; body moderately pubescent.
vesta var. errans (p. 118).
Front with shallow, separated punctures; body very sparsely pubescent.
vesta var. sappho (p. 117).

67. First segment of flagellum about twice as long as it is wide at the apex, almost as long as segments 3 and 4 united; second abdominal tergite coarsely, foveately punctate--68.
First segment of flagellum distinctly shorter than twice its width at the apex, much shorter than segments 3 and 4 united; second abdominal tergite moderately punctate---70.

68. Head and thorax silvery pubescent and with scattered, erect, black hairs; no definite areas of black pubescence on vertex, or dorsum of thorax.
eurynome (p. 209).
Head and thorax more or less silvery pubescent, but vertex, or dorsum of thorax with definite areas of black pubescence---------------------69.

69. Vertex and mesonotal area with the pubescence predominantly black; second abdominal tergite with a small, basal, median spot of black pubescence.
saetigera (p. 211).
Only the pronotal area with the pubescence predominantly black; second abdominal tergite with a submedian spot of black pubescence.
bonita (p. 208).

70. Head and thorax with pale pubescence throughout---------------------71.
Pronotal and mesonotal areas clothed with black recumbent pubescence and scattered, erect, dark hairs---------------------------**birkmani** (p. 205).

71. Apical half of second abdominal tergite with two large, round, confluent pale yellow spots; punctures of this latter area large, separated, those of the remainder of the disk moderate and dense; apical fringe of third tergite black, interrupted medially by a spot of silvery pubescence.
paenulata (p. 206).

Apical half of second tergite somewhat paler than remainder of tergite, but punctuation not different; pubescence of third tergite entirely silvery.
caneo (p. 203).

72. Genae as coarsely sculptured as the front and vertex ---------- 73.

Genae not nearly as coarsely sculptured as the front and vertex ---------- 80.

73. Posterior margin of genae carinate or subcarinate ---------- 74.

Posterior margin of genae rounded ---------- 79.

74. Posterior margin of genae strongly carinate; abdominal sternites with an apical fringe of pale or red hairs ---------- 75.

Posterior margin of genae only subcarinate; abdominal sternites for the most part fringed with black hairs ---------- 77.

75. Abdomen above clothed with dense, very long, shaggy pubescence; pubescence of first abdominal tergite black ---------- 76.

Abdomen above very sparsely clothed with erect black pubescence; second tergite with a pair of basal lateral spots of white recumbent hairs and a thick apical fringe of white hairs; pubescence of first abdominal tergite white ---------- **sicheliana** (p. 246).

76. Pubescence of head, thorax, and legs black, of abdomen red.
magnifica (p. 234).

Pubescence of head, thorax, and portions of the legs whitish, of abdomen pale yellow ---------- **magna** (p. 232).

77. Head and thorax with black pubescence ---------- 78.

Head and thorax with yellowish pubescence ---------- **calorata** (p. 227).

78. Abdomen (except first segment) entirely clothed above with erect, red hairs.
klugii (p. 229).

First segment, base, and apex of second abdominal tergite, third tergite and base of fourth tergite medially with black hairs; remainder of abdomen with red hairs ---------- **clotho** (p. 231).

79. Second abdominal tergite with the punctures small and more or less confluent; dorsum of propodeum with red to yellowish pubescence.
occidentalis (p. 221).

Second abdominal tergite with the punctures very large and separated, almost foveate; dorsum of propodeum with black pubescence.
occidentalis var. **comanche** (p. 225).

80. Pubescence of abdominal tergites 3–5 concolorous with that of tergite 2 ---------- 81.

Pubescence of abdominal tergites 3–5 not concolorous with that of tergite 2 ---------- 82.

81. Sternites 2–5 with a thick apical fringe of pale pubescence ---------- **satanas** (p. 239).

Sternites 2–5 with the apical fringe of pubescence black, at least medially.
sackenii (p. 237).

82. Apical fringes of abdominal sternites silvery; abdominal tergites 3–5 with silvery pubescence at least laterally ---------- **ursula** (p. 143).

Abdomen beneath entirely black; tergites 3–5 almost entirely black pubescent ---------- 83.

83. Pygidium distinctly longitudinally striate; pubescence of thorax and abdomen mostly sparse and recumbent ---------- **medea** (p. 143).

Pygidium either irregularly or longitudinally rugose; pubescence of thorax and abdomen mostly dense and erect ---------- 84.

84. Pygidium irregularly rugose; genae with rather large, confluent punctures; eyes of moderate size, the distance between the eye margins and the postero-lateral angles of the head equal to one-half the greatest diameter of the eyes---------- **scitula** (p. 244).
Pygidium longitudinally rugose; genae with small, well-separated punctures; eyes large, the distance between the eye margins and the postero-lateral angles of the head not greater than one-third the greatest diameter of the eyes---------- **arenivaga** (p. 278).

85. Pygidium granulate; thorax pyriform, scutellar scale absent---------- 87.
Pygidium longitudinally striate; thorax subhexagonal, scutellar scale present---------- 86.

86. Pubescence of head, thorax, and abdomen concolorous; legs clothed with white hairs---------- **helva** (p. 259).
Pubescence of head and thorax black, of abdomen fulvous; legs clothed with black hairs---------- **nogalensis** (p. 258).

87. Postero-lateral angles of head carinate---------- 88.
Postero-lateral angles of head rounded---------- 89.

88. Carina of postero-lateral angles somewhat crenulate; apical margin of second abdominal tergite with pale silvery pubescence at the middle. **dilucida** (p. 267).
Carina of postero-lateral angles not crenulate, straight; apical margin of second abdominal tergite with a broad band of black pubescence. **chrysocoma** (p. 266).

89. Antennal scrobes distinctly carinate above---------- **heliophila** (p. 265).
Antennal scrobes not carinate above---------- 90.

90. Pubescence of head and thorax sparse, the sculpturing not concealed. **obscura** (p. 261).
Pubescence of head and thorax dense, concealing the sculpture. **poecilonota** (p. 264).

Males

1. Apices of middle and hind femora squarely truncate, the surface of the truncations sulcate; clypeus very prominently bidentate medially---------- 71.
Apices of middle and hind femora more or less rounded not modified as above; clypeus feebly bidentate medially---------- 2.

2. Posterior trochanters produced at the apex within, into a prominent blunt tooth---------- 3.
Posterior trochanters simple, not produced within---------- 5.

3. Second abdominal sternite convex, not at all scabrose; pygidial area pubescent throughout---------- **creon** (p. 276).
Second abdominal sternite concave, the sides and apex scabrose; pygidial area bare---------- 4.

4. Body black---------- **eminentia** (p. 79).
Body ferruginous---------- **furina** (p. 82).

5. Ventral surface of posterior tibiae very greatly flattened distinctly arcuate---------- 6.
Posterior tibiae cylindrical, ventral surface not flattened---------- 8.

6. Mesonotum clothed with black pubescence; head, pronotum, scutellum, and metanotum with pale pubescence---------- 7.
Head, pronotum, mesonotum, scutellum, and metanotum with scarlet pubescence---------- **foxi** (p. 84).

7. From Texas and Colorado---------------------------------**dugesii** (p. 87).
From Arizona---**phoenix** (p. 85).
8. Eyes and ocelli abnormally large and prominent--------------------------9.
Eyes and ocelli normal--10.
9. Wings subhyaline; pubescence of abdomen from apical margin of second tergite white-------------------------------------**subhyalina** (p. 281).
Wings fuliginous; pubescence of abdomen from apical margin of second tergite yellow---------------------------------**megalophthalma** (p. 282).
10. Postero-lateral angles of last abdominal sternite dentiform-------------11.
Postero-lateral angles of last abdominal sternite rounded, not at all dentiform --13.
11. Pubescence of thorax above yellowish or reddish--------**fulvohirta** (p. 66).
Pubescence of thorax entirely black--------------------------------------12.
12. Second abdominal sternite with a median pit densely filled with hairs. **cotulla** (p. 75).
Second abdominal sternite without a median pit, or a row of hairs simulating a carina---**vandala** (p. 75).
13. Second abdominal sternite with a median pit densely filled with hairs, or with a median row of short, dense, stiff hairs simulating a carina---38.
Second abdominal sternite plain, without any such modification; (in *bioculata* there is usually a poorly defined pit, but it is not densely filled with hairs; there is occasionally a rudimentary pit in *ursula*)--------14.
14. Pubescence of abdominal tergites 3–6, mostly black---------------------15.
Pubescence of abdominal tergites 3–6 not mostly black, either red, yellow, or white ---21.
15. Apical abdominal segments inconspicuously grayish pubescent above----16.
Apical abdominal segments entirely black pubescent---------------------17.
16. Second abdominal segment entirely ferruginous, second tergite with distinct separated punctures--------------------------------------**arcana** (p. 217).
Second abdominal segment black beneath, and at the base and apex above; second tergite with dense, contiguous punctures-----------**reclusa** (p. 219).
17. Tegulae punctate throughout; posterior third of mesonotum extended laterally each side into a broad distinct lobe------------------------------18.
Posterior face of tegulae glabrous, impunctate; mesonotum not extended into lateral lobes posteriorly--19.
18. Pubescence of head, thorax, and legs black------------------**vesta** (p. 105).
Pubescence of head, thorax, and legs silvery gray------**columbiana** (p. 119).
19. Pubescence of mesonotum and scutellum ferruginous; usually only apical half of second abdominal tergite ferruginous----------**bioculata** (p. 126).
Pubescence of thorax entirely black; second abdominal tergite almost entirely ferruginous--20.
20. Second abdominal sternite ferruginous----------------------**sparsa** (p. 88).
Second abdominal sternite dark mahogany red to black----**macra** (p. 97).
21. Body entirely black, inconspicuously clothed with grayish pubescence. **gibbosa** (p. 202).
Body entirely black or not, but conspicuously clothed with white, yellow, or red pubescence---22.
22. Apical half of second abdominal tergite clothed with red or yellowish pubescence--25.
Pubescence of second abdominal tergite entirely black except the apical, and sometimes subapical fringe colored otherwise-------------------------23.

23. Pubescence of head, thorax, and apical segments of abdomen concolorous ---------- 24.
Pubescence of head and thorax black, that of the apical segments of the abdomen fulvous ---------- zelaya (p. 120).

24. Pubescence of vertex, dorsum of thorax, and apical abdominal tergites ochraceous ---------- myrice (p. 121).
Pubescence of vertex, dorsum of thorax and apical abdominal tergites whitish ---------- candida (p. 296).

25. Pygidium with a distinct apical fringe of short, erect hairs ---------- 30.
Pygidium bare, without a distinct apical fringe of hairs ---------- 26.

26. Second sternite with a median area of fine, close punctures, each of the latter bearing a fine hair ---------- 27.
Second sternite with large punctures only, no such median area ---------- 28.

27. Pubescence of head and thorax black; that of the abdomen varying from red to yellow ---------- atrifulva (p. 290).
Pubescence of head and thorax varying from red to yellow, concolorous with that of the abdomen ---------- ocydrome (p. 292).

28. Ultimate abdominal sternite squarely truncate at the apex, with scattered punctures throughout ---------- testaceiventris (p. 302).
Ultimate abdominal sternite not truncate at the apex, the latter produced forming a blunt median tooth, which is sometimes slightly emarginate; apical third of ultimate sternite glabrous, impunctate ---------- 29.

29. Pronotum conspicuously emarginate medially; first segment of flagellum very distinctly shorter than the second ---------- abdita (p. 293).
Pronotum very weakly emarginate medially; first segment of flagellum subequal to the second, especially when measured ventrally.
coccineohirta (p. 124).

30. Integument of second abdominal tergite with a pair of large yellow spots on the apical half (in some specimens the spots coalesce, the disk of the second tergite then being largely yellow) ---------- 31.
Integument of second abdominal tergite entirely black ---------- 32.

31. Pubescence of vertex, and dorsum of thorax yellowish ---------- ursula (p. 143).
Pubescence of vertex, and dorsum of thorax black.
ursula var. chiron (p. 148).

32. Antennal scrobes not at all carinate above ---------- 33.
Antennal scrobes distinctly carinate above ---------- 35.

33. Tegulae finely, setigerously punctate throughout ---------- medora (p. 101).
Tegulae glabrous impunctate, at least on the posterior half ---------- 34.

34. Pubescence of vertex and dorsum of thorax black ---------- perilla (p. 300).
Pubescence of vertex and dorsum of thorax yellowish.
perilla var. gentilicia (p. 301).

35. Ocelli very large and conspicuous; apical fringes of abdominal sternites entirely black ---------- dorippa (p. 297).
Ocelli of normal size; apical fringes of abdominal sternites laterally reddish ---------- 36.

36. First segment of flagellum subequal in length to the second; anterior margin of pronotum not at all emarginate medially ---------- glycera (p. 299).
First segment of flagellum distinctly shorter than the second; anterior margin of pronotum weakly emarginate medially ---------- 37.

37. Pubescence of mesonotum entirely black ---------- phaon (p. 301).
Pubescence of mesonotum in part or entirely red.
phaon var. fimbrialis (p. 302).

38. Second abdominal sternite with a median pit, densely filled with hairs----43.
Second abdominal sternite with a median row of short, dense, stiff hairs simulating a carina----39.
39. Pubescence of abdominal tergites caudad of the apical margin of the second black----40.
Pubescence of abdominal tergites caudad of apical margin of the second yellowish to ferruginous----42.
40. Pubescence of vertex and mesonotum golden yellow----**asopus** (p. 60).
Pubescence of vertex and mesonotum black----41.
41. Body entirely ferruginous----**cassandra** (p. 64).
Head, thorax, and apical abdominal segments black----**bexar** (p. 62).
42. Body largely ferruginous, the pubescence above mostly golden yellow. **hector** (p. 62).
Head and thorax entirely black; abdominal tergites from base of the second clothed with ferruginous pubescence----**waco** (p. 63).
43. Apical abdominal tergites clothed with inconspicuous grayish pubescence; remainder of abdomen black pubescent----44.
Apical abdominal tergites not clothed with inconspicuous grayish pubescence; remainder of abdomen not black pubescent----47.
44. Pronotum with somewhat dense, conspicuous grayish pubescence----45.
Pronotum with sparse; inconspicuous blackish pubescence----46.
45. Integument of abdomen entirely ferruginous; tegulae more or less punctate throughout; mesonotum with grayish pubescence----**monticola** (p. 214).
Integument of abdomen not entirely ferruginous, the apical abdominal segments black; tegulae glabrous, impunctate except at basal and inner lateral margins; pubescence of mesonotum dark, almost black. **polia** (p. 215).
46. Head and thorax for the most part black pubescent; propodeum extraordinarily deeply, foveately reticulate----**canella** (p. 212).
Head and thorax more or less grayish pubescent; propodeum shallowly, foveately reticulate----**macilenta** (p. 215).
47. Last abdominal tergite with a fringe of hairs at the apical margin (the fringe usually complete, but sometimes absent medially)----48.
Last abdominal tergite without an apical fringe of hairs----57.
48. Head and thorax above clothed with whitish hairs, the abdomen from apex of tergite two with pale yellowish hairs----**magna** (p. 232).
Body clothed with red and black, or mostly black pubescence----49.
49. Abdominal tergites from the apical margin of the second clothed entirely with black pubescence----53.
Abdominal tergites from the apical margin of the second clothed entirely with red or yellow pubescence (sometimes pubescence of apical half of second tergite is red or yellow, and in one species the pubescence of the fourth and fifth tergites is sometimes black)----50.
50. Dorsum of thorax, and usually vertex, clothed with red pubescence; second abdominal tergite with only an apical fringe of red hairs----51.
Head and thorax clothed entirely with black pubescence; apical half of second abdominal tergite clothed with red pubescence----52.
51. Eastern species (Louisiana and eastward)----**occidentalis** (p. 221).
Western species (Texas and westward)-**occidentalis** var. **comanche** (p. 225).
52. Abdominal sternites with a fringe of long, reddish pubescence at the apical margin----**magnifica** (p. 234).
Abdominal sternites with only a lateral fringe of long, reddish pubescence at the apical margin----**klugii** (p. 229).

53. Pit on second sternite distinctly basal in position-------------hora (p. 196).

Pit on second sternite approximately median in position----------------54.

54. Antennal scrobes not, or very obscurely carinate above; lateral lobes of anterior division of scutellum coarsely punctate throughout-----------55.

Antennal scrobes distinctly carinate above; basal fourth or third of lateral lobes of anterior division of scutellum glabrous, impunctate-----------56.

55. Vertex and dorsum of thorax clothed with black pubescence. lepeletierii (p. 132).

Vertex and dorsum of thorax clothed with fulvous pubescence. pyrrhus (p. 139).

56. Dorsum of thorax clothed with black pubescence-----praegrandis (p. 148).

Dorsum of thorax clothed with fulvous pubescence. praegrandis var. russata (p. 152).

57. Pubescence of head, thorax, and legs entirely black--------------------58.

Pubescence of head and thorax, at least above, not black, colored otherwise---65.

58. Apical margin of second tergite, and tergites 3–5 entirely, with yellowish, reddish, or orange pubescence--------------------------------------59.

Apical margin of second tergite, and tergites 3–5 entirely, with black pubescence---61.

59. Integument of apical half of second abdominal tergite yellowish. serenitas (p. 289).

Integument of apical half of second abdominal tergite black------------60.

60. Pronotum emarginate medially on the cephalic margin; fulvous pubescence covering only the apical margin of second tergite--------chisos (p. 284).

Pronotum not emarginate medially on the cephalic margin; fulvous pubescence covering apical half of second tergite------------mimula (p. 255).

61. Posterior declivity of tegulae setigerously punctate------gentilis (p. 199).

Posterior declivity of tegulae glabrous, impunctate----------------------62.

62. Pit on second abdominal sternite distinctly basal in position-castor (p. 198).

Pit on second abdominal sternite distinctly median in position---------63.

63. Narrow lateral rim of second abdominal tergite microscopically punctate, clothed with very fine, short pubescence; first abdominal segment and second abdominal sternite usually black or blackish------------------64.

Narrow lateral rim of second abdominal tergite impunctate, glabrous, bare; first and second abdominal segments, and sometimes propodeum ferruginous--------------------------------------rubricosa (p. 192).

64. Occiput with distinct lateral depressions, leaving a median area distinctly elevated; anterior margin of pronotum distinctly emarginate medially, the dorsum not broadly rounding medially into the cephalic surface. meracula (p. 201).

Occiput without or with only very faint lateral depressions; anterior margin of pronotum not emarginate medially; the dorsum broadly rounding medially into the cephalic surface--------------------permista (p. 189).

65. Head fully as wide as the thorax-------------------------------------66.

Head distinctly narrower than the thorax----------------------------67.

66. Head, thorax, and abdomen, above clothed with golden yellow pubescence. aureola (p. 251).

Head, thorax, and abdomen, above clothed with scarlet pubescence. aureola var. pacifica (p. 253).

67. Pubescence of legs white or pale, abdominal integument for the most part ferruginous ---68.

Pubescence of legs entirely black; abdominal integument entirely black--69.

68. Apical abdominal segments black---------------------**intermixta** (p. 256).
Apical abdominal segments pale ferruginous----------**poliothrix** (p. 285).
69. Pubescence of abdominal tergites 3–6 concolorous with the pubescence of the head and thorax above---70.
Pubescence of abdominal tergites 3–6 entirely black, the vertex, thorax above and disk of abdominal tergite two with yellow pubescence. **scitula** (p. 244).
70. Pubescence of second tergite usually entirely black, sometimes the apical fringe whitish or pale yellow; pubescence very long and shaggy. **sackenii** (p. 237).
Apical third to half of second tergite with red to yellow pubescence; pubescence long, but not shaggy--------------------------**reperticia** (p. 287).
71. Calcaria dark; head clothed with black pubescence--------------------72.
Calcaria whitish; head clothed more or less with silvery pubescence----73.
72. Apical fringes of abdominal segments 2–6 black---------**obscura** (p. 261).
Apical fringes of abdominal segments pale---------------**snoworum** (p. 264).
73. Sides of thorax and propodeum bright ferruginous----**errabunda** (p. 269).
Thorax and propodeum entirely black or dark mahogany red------------74.
74. Pubescence of abdomen entirely pale-------------------**sophrona** (p. 271).
Abdomen with more or less black pubescence-----------------------------75.
75. Lateral processes of scutellum large, glabrous, impunctate; apical fringes of abdominal tergites 2–4 pale, of 5 and 6 black---------**apicalata** (p. 273).
Lateral processes of scutellum small, for the most part punctate; apical fringes not as above---76.
76. First segment of flagellum distinctly shorter than the second; pubescence of apical half, and apical fringe of second tergite black, pubescence of remainder of abdomen mostly pale--------------------**digressa** (p. 273).
First segment of flagellum subequal in length to the second; pubescence of abdomen almost entirely black-------------------------**curialis** (p. 274).

DISCUSSION OF SPECIES

GROUP ASOPUS

The females of this group have the mandibles tridentate; the thorax longer than broad, subhexagonal, and without a scutellar scale; and the pygidium rugose. The second abdominal sternite of the males has a median, longitudinal row of short, erect hairs on the apical half, simulating a carina.

1. DASYMUTILLA HARMONIA (Fox)

Mutilla harmonia Fox, Trans. Amer. Ent. Soc., vol. 25, p. 299, 1899, female.—Melander, Trans. Amer. Ent. Soc., vol. 29, p. 295, 1903, female.

Ephuta (*Ephuta*) *harmonia* André, Gen. Ins., vol. 1, fasc. 11, p. 60, 1903, female.

Ephuta sparsiformis Cockerell and Rohwer, Psyche, vol. 15, p. 4, 1908, female.

Pycnomutilla harmonia Rohwer, Proc. U. S. Nat. Mus., vol. 41, p. 455, 1912, female (not male).

Pycnomutilla sparsiformis Rohwer, Proc. U. S. Nat. Mus., vol. 41, p. 455, 1912, female.

Bruesia harmonia Rohwer, Bull. 22, Conn. Geol. Nat. Hist. Surv., p. 622, 1916, female.

Dasymutilla (*Bruesia*) *harmonia* Bradley, Trans. Amer. Ent. Soc., vol. 42, p. 321, 1916, female.

Dasymutilla harmonia Banks, Ann. Ent. Soc. Amer., vol. 14, p. 25, 1921, female.—Mickel, 19th Rept. State Ent. Minn., p. 102, 1923, female.

Bruesia sparsiformis Rau, Trans. Acad. Sci. St. Louis, vol. 24, no. 7, p. 3, 1922.

Type.—Female, Atlantic coast, in collection of American Entomological Society of Philadelphia. The type of *sparsiformis* is in the collection of the United States National Museum.

Distribution.—Massachusetts, Connecticut, New York, Pennsylvania, New Jersey, Virginia, North Carolina, Georgia, Florida, Mississippi, Tennessee, Indiana, Michigan, Illinois, Missouri, Iowa, Minnesota, Manitoba, Montana, Wyoming, North Dakota, South Dakota, Nebraska, Kansas, Colorado, Oklahoma, and Texas. (Fig. 1.)

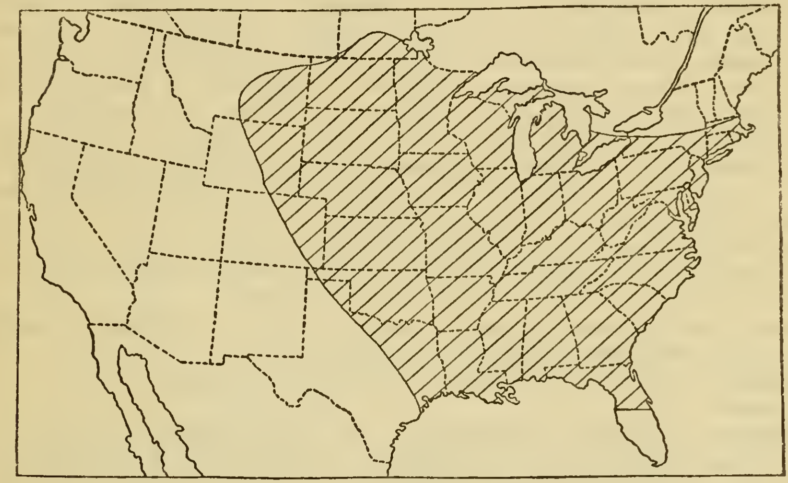

Fig. 1.—Distribution of Dasymutilla harmonia (Fox)

SPECIMENS EXAMINED

Colorado: Female, Julesburg, August 4, 1899; female, Brush, July 10, 1915 (C. E. Mickel); 2 females, Fort Logan, August 18, 1901 (J. S. Hunter); female, Fort Collins, August 23, 1899; female, Boulder, September 20 (Cockerell); female, Golden, May 3, 1902; female, Lamar, July 10, 1899; 7 females, Bent County, August 29; female, South Park, August 29, 1901 (Oslar); 2 females, Clear Creek (Oslar); 4 females.

Florida: Female, LaBelle, May 8–10, 1916 (J. C. Bradley); female, Titusville, November 8, 1911; female, Gainesville, May 15, 1914.

Georgia: Female, Spring Creek, Decatur County, May 18–21, 1916 (J. C. Bradley); female, Spring Creek, Decatur County, June 7–23, 1911 (J. C. Bradley); female, Billy's Island, Okefenokee Swamp, June, 1912.

Illinois: Female, Rockford, August 26, 1902.

INDIANA: 2 females, Gary, July, 1925 (J. A. Harris, Jr.).

IOWA: Female, Iowa City, May 1 (Wickham); female, Sioux City, July 15, 1920 (C. N. Ainslie).

KANSAS: Female, Wellsville, July 23, 1901; 2 females, Douglas County, October 4, 1911 (F. X. Williams); female, Wabaunsee County (Forrest Anderson); female, Riley County, May 4 (Popenoe); 2 females, Riley County, June 26 (G. A. Dean); female, Riley County, July 12 (Popenoe); 3 females, Riley County, July 18 (G. A. Dean); 2 females, Riley County, August 5 (G. A. Dean); female, Riley County, August 12 (G. A. Dean); female, Riley County, August 25 (Popenoe); female, Riley County, September 27 (G. A. Dean); female, Riley County, September (Marlatt); female, Riley County, October 25 (Popenoe); female, Riley County; female, Sumner County, 1916 (R. H. Beamer); female, Medora, September 21 (Horton); female, Russell County, August 26, 1917 (F. X. Williams); female, Comanche County, 1916 (R. H. Beamer); female, Rush County, June 28, 1912 (F. X. Williams); female, Rooks County, August 7, 1912 (F. X. Williams); 2 females, Norton County, August 24, 1912 (F. X. Williams); 2 females, Meade County, July 10, 1911 (F. X. Williams); 2 females, Gove County (F. X. Williams); 2 females, Rawlins County (F. X. Williams); female, Logan County (F. X. Williams); female, Hamilton County; female, Wallace County, July 8; 3 females, Wallace County (F. X. Williams); female, Cheyenne County (F. X. Williams); 8 females (T. B. A.).

MANITOBA, CANADA: Female, Treesbank, July 20, 1910 (J. B. Wallis); 4 females, Aweme, July 13, 1907 (H. Skinner); female, Aweme, August 19, 1913 (N. Criddle); female, Onah, June 21, 1921 (A. Gibson).

MASSACHUSETTS: Female, Sconset, August 4, 1902 (J. L. Zabriskie); female, Woods Hole, July 18, 1922 (E. G. Anderson).

MICHIGAN: 2 females, Harrisville, Alcona County, August 13, 1921 (F. M. Gaige).

MINNESOTA: 2 females, Jordan, July 13, 1923 (A. T. Hertig); female, Castle Rock, August 30, 1925 (F. C. Fletcher); 4 females, Fort Snelling, July 27, 1922 (C. E. Mickel); female, Gray Cloud Island, August 5, 1896; 2 females, Hennepin County; female, Fridley sand dunes, Anoka County, June 8, 1923 (Wm. E. Hoffmann); female, Fridley sand dunes, Anoka County, June 30, 1923 (H. H. Knight); 2 females, Fridley sand dunes, Anoka County, July 3, 1923 (C. E. Mickel); 3 females, Fridley sand dunes, Anoka County, July 24, 1923 (C. E. Mickel); 2 females, Fridley sand dunes, Anoka County, July 26, 1923 (R. W. Dawson); 4 females, Fridley sand dunes, Anoka County, July 28, 1922 (C. E. Mickel); 3 females, Fridley sand dunes, Anoka County, July 28, 1922 (Paul Gilmer); female, Fridley sand dunes, Anoka County, August 8, 1922, (A. T. Hertig); 4 females, Fridley sand dunes, Anoka County, August 8, 1922 (C. W. Johnson); female, Rice Creek Anoka County, September 10, 1925 (C. B. Philip).

MISSISSIPPI: Female, Agri. College, July 19, 1913 (J. B. Hester); female, Agri. College, April 19, 1922 (W. L. Hughes); female, Agri. College, April 12, 1917 (F. G. Wreus).

MISSOURI: Female, Hollister, August 12, 1912 (H. H. Knight); female, Potosi, June 28, 1923 (W. J. Clench).

MONTANA: 2 females, Billings, July 30, 1910.

NEBRASKA: Female, Omaha, June 9, 1914 (L. T. Williams); female, Omaha, September 5, 1913 (L. T. Williams); female South Bend, June 23, 1915 (E. M. Partridge); female, Louisville, July 5, 1915 (E. G. Anderson); female, Lincoln, September 17, 1914 (C. E. Mickel); female Maskell, July 20, 1915 (E. G. Anderson); female, Holt County; female, Halsey, August 15, 1925 (R. W. Dawson); female, Halsey, August 16, 1925 (R. W. Dawson); female, Halsey, August 29, 1924 (R. W. Dawson); female, Halsey, August 30, 1924 (R. W. Dawson); female, Halsey, September 3, 1924 (R. W. Dawson); female, Sand Hills, September; female, North Platte, July 3, 1912 (L. M. Gates); female, Gering, August 14, 1901 (M. A. Carriker, Jr.); 2 females, Scottsbluff, August 5, 1923 (Leonard Worley); female, Mitchell, June 14, 1916 (C. E. Mickel); female, Mitchell, July 11, 1916 (C. E. Mickel); female, Mitchell, July 26, 1916 (C. E. Mickel); female, Mitchell, August 4, 1916 (C. E. Mickel); female, Mitchell, September 8, 1916 (R. W. Dawson); female, Glen, August 20, 1906 (H. S. Smith); female, Monroe Canyon, Sioux County, August 2, 1913 (E. J. Taylor); female, Monroe Canyon, Sioux County, August 20, 1908 (J. T. Zimmer); female, Monroe Canyon, Sioux County, August 27, 1912 (E. J. Taylor); female, Bad Lands mouth of Monroe Canyon, Sioux County, June 21, 1911 (R. W. Dawson); female, Warbonnet Canyon, Sioux County, August 12, 1908 (J. T. Zimmer); female, Sioux county; female, Pine Ridge, July.

NEW JERSEY: Female, Iona, June 8, 1902; 2 females, Iona, June 16, 1902; female, Brown's Mill Junction, June 25, 1905; female, Lakehurst, July 3, 1912; 2 females, Lakehurst, July 5, 1909; 2 females, Lakehurst; female, Palisades, June 12, 1898.

NEW YORK: Female, Cold Springs Harbor, L. I., June 18, 1921 (E. G. Anderson); female, Cold Springs Harbor, L. I., June 18, 1921 (S. H. Emerson); 2 females, Cold Springs Harbor, L. I., June 20, 1923 (E. G. Anderson); female, Cold Springs Harbor, L. I., June 28, 1921 (E. G. Anderson); female, Cold Springs Harbor, L. I., September 13, 1922 (E. G. Anderson); female, Cold Springs Harbor, L. I., September 14, 1921 (E. G. Anderson); female, Long Island, July 18, 1898 (J. Akhurst); female, Eldon, L. I., September 1, 1916 (W. T. Davis); female, Albany, July 9, 1888; female, Orient, August 19, 1909 (I. L. Zabriskie).

NORTH DAKOTA: Female, Marmarth, July 4, 1918 (O. A. Stevens); female, Cannon Ball, August 20, 1922 (O. A. Stevens); female.

OKLAHOMA: Female, Payne County, June 24, 1925 (W. J. Brown); 2 females, Payne County, September 23, 1923 (W. J. Brown).

PENNSYLVANIA: Female, Rockville, September 5, 1910 (H. B. Kirk); female, Charter Oak, June 21, 1917 (J. N. Knull).

SOUTH DAKOTA: 3 females, Capa, September 11, 1917 (H. C. Severin); female, Cedar Pass (W. H. Over); female, Pine Ridge, July 8, 1907 (Thompson); female, Interior, August 5, 1924; female, Newell, August 23, 1924; 2 females, Whitewood, May 28, 1924 (H. C. Severin); female, Hot Springs, July 11, 1924; female, Martin, June 16, 1925 (H. C. Severin); female, Martin, September 3, 1924 (H. C. Severin); female, Buffalo, July 31, 1924.

TENNESSEE: Female, Allardt, Fentress County, August 15, 1922 (T. H. Hubbell).

TEXAS: Female, Colorado County, June 4, 1922 (Grace O. Wiley); female, Colorado County, June 23, 1922 (Grace O. Wiley); female, Columbus, August 7, 1922 (Grace O. Wiley); 2 females, Mineola, July 19, 1906 (Bishopp and Jones); female, Mineola, August 6, 1904 (C. R. Jones); female, Dallas, September 30, 1918 (T. H. Hubbell).

VIRGINIA: Female, Falls Church, September 1, 1915 (C. T. Greene); 2 females, Falls Church, September 4, 1915 (C. T. Greene); female, Great Falls, September 12.

WYOMING: Female, Sheridan (Metz).

The specimens examined vary in length from 7.5 to 13 mm. The specimens from western States do not differ noticeably from those of eastern States. In some specimens the four pale spots of the second abdominal tergite are very evident, in others almost entirely lacking. Occasional specimens have the apical fringe of the second tergite silvery, rather than black, with the lateral extremes and a median spot silvery. I have examined the type of *sparsiformis* Cockerell and Rohwer and find it to be the same as this species.

2. DASYMUTILLA ASOPUS (Cresson)

Plate 1, fig. 1

Mutilla asopus CRESSON, Proc. Ent. Soc. Phila., vol. 4, p. 435, 1865, male.—BLAKE, Trans. Amer. Ent. Soc., vol. 7, p. 244, 1879, male.—DALLE TORRE, Cat. Hymen., vol. 8, p. 12, 1897, male.—FOX, Trans. Amer. Ent. Soc., vol. 25, p. 229, 1899, male.

Mutilla (Sphaerophthalma) asopus BLAKE, Trans. Amer. Ent. Soc., vol. 3, p. 237, 1871, male.

Sphaerophthalma asopus BLAKE, Trans. Amer. Ent. Soc., vol. 8, p. 225, 1886, male.

Ephuta (Ephuta) asopus ANDRÉ, Gen. Ins., vol. 1, fasc. 11, p. 57, 1903, male.

Dasymutilla asopus MICKEL, 19th Rept. State Ent. Minn., p. 102, 1923, male.

Type.—Male, Colorado Territory, in collection of American Entomological Society of Philadelphia.

Plesiotype.—Male, Ridgway, Colorado, July (Oslar), in collection of University of Minnesota.

Distribution.—Texas, Kansas, Nebraska, Colorado, South Dakota, Minnesota, Manitoba, North Dakota, and Montana. (Fig. 2.)

SPECIMENS EXAMINED

COLORADO: Male, Sterling, August 3, 1899; male, Boulder, August 6, 1910 (Cockerell); male, Golden, August 9, 1898; male, Platte Cañon, July (Oslar); male, Lemar, July 10, 1899; male, Bent County, August 23 (Lantz); male, Bent County, August 29 (Lantz); male, Berkeley, September 24, 1902 (Oslar).

KANSAS: 2 males, Riley County, July 26 (G. A. Dean); male, Riley County, August 6 (J. B. Norton); male, Riley County, September 4 (Popenoe); 2 males, Riley County (J. B. Norton); male, Pratt County, June 27, 1911 (F. X. Williams); 2 males, Meade County, July 10, 1911 (F. X. Williams); male, Scott County (F. X. Williams); male.

MANITOBA, CANADA: Male, Aweme, August 2, 1907 (N. Criddle).

MINNESOTA: Male, Gray Cloud Island, August 20, 1898; male, Fort Snelling, July 27, 1922 (C. E. Mickel); male, Fridley sand dunes, Anoka County, August 8, 1922 (C. W. Johnson).

MONTANA: Male, Huntley, July 20, 1917.

Nebraska: Male, Omaha, July 7, 1914 (L. T. Williams); male, South Bend, November 3, 1894; male, Cedar Bluffs, September 27, 1913 (G. W. Deming); male, Sand Hills, July; 2 males, Sand Hills, September; male, Halsey, August 25, 1925 (R. W. Dawson); male, Scottsbluff, August 5, 1923 (Leonard Worley); male, Mitchell, August 5, 1914 (L. M. Gates); male, Mitchell, August 8, 1915 (E. M. Partridge); male, Mitchell, September 8, 1915 (E. M. Partridge); male, Glen, August 14, 1906 (P. R. Jones); male, Glen, August, 1905; male, Monroe Canyon, Sioux County, August 20, 1908 (R. W. Dawson); male, Monroe Canyon, Sioux County, August 24, 1908 (J. T. Zimmer); male, Bad Lands, Sioux County, August 10, 1908 (C. H. Gable); male, Pine Ridge.

North Dakota: 2 males, Sheldon, August 28, 1920 (O. A. Stevens).

South Dakota: Male, Newell, July 27, 1923 (H. C. Severin); male, Rapid City, September 6, 1923 (H. C. Severin); male, Hot Springs, July 11, 1924.

Texas: Male, Colorado County, June 5, 1922 (Grace Olive Wiley).

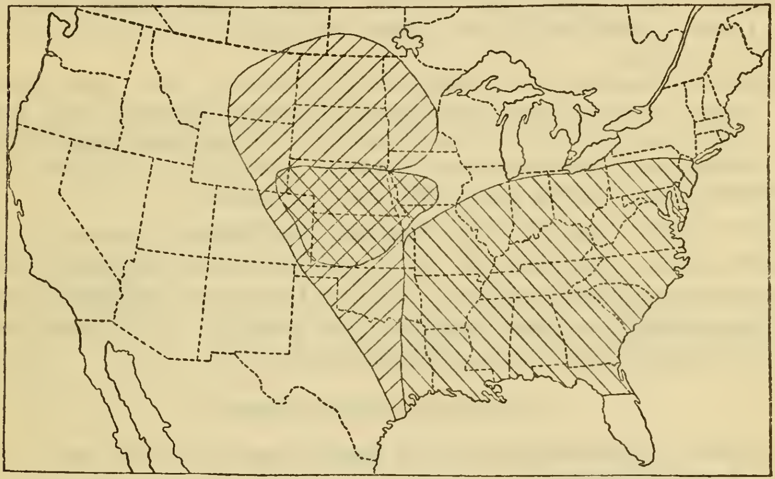

Fig. 2. Distribution of Dasymutilla asopus (Cresson). ▨
" " Dasymutilla hector (Blake). ▩
" " Dasymutilla bexar (Blake). ▧

Fox (1899) suggests that this and the two following species may be only forms of one species, rather than three distinct species. There is no additional evidence at present to lend weight to either view. *Harmonia* is found throughout the range of all three species, which indicates that possibly Fox's view is correct. *Harmonia*, however, has not been definitely associated with any of these three males.

In 1925 Charles H. Hicks, of Boulder, Colorado, sent me a specimen of male Mutillid which he had collected from the cell of a bee, *Dianthidium* species. Only the abdomen remained, but it was possible to identify the specimen as either *asopus* or *hector* by the genitalia and the characteristic second abdominal sternite. It therefore appears that this species, or possibly the following one, is parasitic on *Dianthidium* species.

3. DASYMUTILLA HECTOR (Blake)

Mutilla (*Sphaerophthalma*) *hector* BLAKE, Trans. Amer. Ent. Soc., vol. 3, p. 237, 1871, male.

Mutilla hector BLAKE, Trans. Amer. Ent. Soc., vol. 7, p. 244, 1879, male.—DALLE TORRE, Cat. Hymen., vol. 8, p. 46, 1897, male.—FOX, Trans. Amer. Ent. Soc., vol. 25, p. 230, 1899, male.

Sphaerophthalma hector BLAKE, Trans. Amer. Ent. Soc., vol. 13, p. 225, 1886, male.

Ephuta (*Ephuta*) *hector* ANDRÉ, Gen. Ins., vol. 1, fasc. 11, p. 60, 1903, male.

Type.—Male, Kansas, in collection of American Entomological Society of Philadelphia.

Distribution.—Kansas, Colorado, Nebraska, and Iowa. (Fig. 2.)

SPECIMENS EXAMINED

COLORADO: Male, Lamar, July 10, 1899; 2 males, Bent County, August 23 (Lantz); male, Bent County, August 29 (Lantz).

IOWA: Male, Ames.

KANSAS: Male, Riley County, August 9 (J. B. Norton); male, Riley County, August (Marlatt); male, Riley County, September (Marlatt); male, Rooks County, August 27; male, Lane County (F. X. Williams); male, Wallace County (F. X. Williams); male, Cheyenne County (F. X. Williams).

NEBRASKA: Male, Lincoln, July 4, 1920 (R. W. Dawson).

This species can only be separated from *asopus* Cresson by the color of the pubescence on the apical abdominal segments. This pubescence is black in *asopus*, while in *hector*, the appressed pubescence especially, is golden yellow. The genitalia are identical with those of *asopus* and are therefore not figured.

4. DASYMUTILLA BEXAR (Blake)

Mutilla (*Sphaerophthalma*) *bexar* BLAKE, Trans. Amer. Ent. Soc., vol. 3, p. 238, 1871, male.

Mutilla bexar BLAKE, Trans. Amer. Ent. Soc., vol. 7, p. 244, 1879, male.—DALLE TORRE, Cat. Hymen., vol. 8, p. 15, 1897, male.—FOX, Trans. Amer. Ent. Soc., vol. 25, p. 230, 1899, male.

Sphaerophthalma bexar BLAKE, Trans. Amer. Ent. Soc., vol. 13, p. 229, 1886, male.

Ephuta (*Ephuta*) *bexar* ANDRÉ, Gen. Ins., vol. 1, fasc. 11, p. 58, 1903, male.

Dasymutilla (*Bruesia*) *bexar* BRADLEY, Trans. Amer. Ent. Soc., vol. 42, p. 322, 1916, male.

Type.—Male, Texas, in collection of American Entomological Society of Philadelphia.

Distribution.—New Jersey, Pennsylvania, Maryland, Virginia, Georgia, Florida, Mississippi, Missouri, Indiana, and Texas. (Fig. 2.)

SPECIMENS EXAMINED

FLORIDA: Male, Gainesville, Alachua County, May 5, 1922 (T. P. Winter).

GEORGIA: Male, Spring Creek, Decatur County, May 18–21, 1916 (J. C. Bradley); male, Spring Creek, Decatur County; 2 males, Billy's Island, Okefenokee Swamp, June, 1912; male, Chesser's Island, August 19, 1922.

INDIANA: 3 males, Gary, July 18, 1925 (J. A. Harris, jr.).
MARYLAND: Male, Chestertown, August 4, 1902.
MISSISSIPPI: Male, Beuna Vista, August 30, 1916 (H. L. King); male, Agri. College (W. F. Swan).
MISSOURI: Male, Hollister, August 12, 1912 (H. H. Knight).
NEW JERSEY: Male, Lakehurst, August 15, 1912; male, Da Costa, July 25, 1923.
PENNSYLVANIA: Male, Hummelstown, June 4, 1912 (J. N. Knull).
VIRGINIA: 2 males, Falls Church, July 23, 1913 (W. Middletown); male, Falls Church, August 14, 1913 (C. T. Greene).

The genitalia of this species are the same as those of *asopus* and are therefore not figured. The type of *bexar* has been examined and the specimens placed here are identical with it. The specimens listed by Melander (1903) as this species are certainly not the same as the type, since mention is made that the second ventral segment does not bear a carina, and the latter is very characteristic of this group. Just what Melander's specimens are I am unable to say.

5. DASYMUTILLA WACO (Blake)

Mutilla (*Sphaerophthalma*) *waco* BLAKE, Trans. Amer. Ent. Soc., vol. 3, p. 238, 1871, female.
Mutilla waco DALLE TORRE, Cat. Hymen., vol. 8, p. 98, 1897, female.—FOX, Trans. Amer. Ent. Soc., vol. 25, p. 229, 1899, female, male.—MELANDER, Trans. Amer. Ent. Soc., vol. 29, p. 295, 1903.
Sphraerophthalma waco BLAKE, Trans. Amer. Ent. Soc., vol. 13, p. 229, 1886, female.
Ephuta (*Ephuta*) *waco* ANDRÉ, Gen. Ins., vol. 1, fasc. 11, p. 65, 1903, female.

Type.—Female, Texas, in collection of American Entmological Society of Philadelphia.

Distribution.—Texas.

SPECIMENS EXAMINED

TEXAS: Female, Fedor, April 13, 1897; male, Fedor, August, 1905 (G. Birkman); male, Fedor, September 13, 1905; 3 males, Fedor; female, Lee County, September 6, 1907; 2 males, Lee County, September 11, 1905; male, Lee County, September 13, 1905; male, Lee County, September 20, 1905 (G. Birkman); female, Travis County, April 3, 1903; male, College Station, August 16, 1914 (H. J. Reinhard); male, 3 females.

I have examined the male described by Fox (1899) as having rudimentary wings and believe it to be an abnormal specimen in which the wings have failed to develop properly at the time of the emergence of the adult insect. A second specimen with rudimentary wings has never been found. The male specimens listed above are identical with Fox's specimen in every respect except that the wings are developed as in all other species of this genus. It is also significant that none of the very closely related species, such as *hector*, *asopus*, and *bexar* show any tendency toward rudimentary wings. The genitalia of *waco* are like those of *asopus* and are therefore not figured.

6. DASYMUTILLA MONTIVAGOIDES (Viereck)

Mutilla (*Timulla*) *montivagoides* VIERECK, Trans. Amer. Ent. Soc., vol. 32, p. 185, 1906, female.

Type.—Female, Hamilton County, Kansas (F. H. Snow), in collection of University of Kansas.

Only the unique type seen. This species is very closely related to *harmonia* Fox. It differs from the latter only by the black pubescence of the abdominal sternites and will very likely prove to be only a variety.

7. DASYMUTILLA NIGRICAUDA (Viereck)

Mutilla (*Timulla*) *nigricauda* VIERECK, Trans. Amer. Ent. Soc., vol. 32, p. 187, 1906, female.

Type.—Female, Clark County, Kansas, May (F. H. Snow), in collection of University of Kansas.

Distribution.—Kansas and Texas.

SPECIMENS EXAMINED

KANSAS: Female, Clark County, June (F. H. Snow); female, Meade County, July 10, 1911 (F. X. Williams).

TEXAS: Female, Wharton, June 24, 1917.

I have examined the type and find it very closely related to *harmonia* Fox. It is exactly like *harmonia* in form and sculpture. It probably will prove to be only a variety in which the pale pubescence of the abdomen has been replaced by black.

8. DASYMUTILLA CASSANDRA, new species

Male.—Entirely ferruginous, except the head dark mahogany red; clothed throughout with sparse black pubescence, except a pair of large, obscure, subapical spots on the second abdominal tergite with inconspicuous yellowish pubescence; length, 10 mm.

Head dark mahogany red, the vertex behind the ocelli ferruginous, clothed with sparse, long, erect, black pubescence; mandibles tridentate at the apex; cephalic margin of clypeus very feebly bidentate medially; the clypeus strongly convex, densely, confluently punctate; scape not bicarinate beneath, closely punctate, clothed with coarse, erect, black hairs; first segment of flagellum slightly shorter (measured dorsally) than the second; antennal scrobes not carinate above; front, vertex and genae coarsely, continguously punctate, the vertex posteriorly and the genae not as coarsely sculptured as the front; relative widths of head and thorax, 6–8.

Thorax ferruginous, clothed throughout with erect, and somewhat appressed, sparse, black pubescence; pronotum, mesonotum and scutellum coarsely, continguously even somewhat confluently punctate; basal and lateral margins of the tegulae closely punctate, bearing coarse black hairs, the disk and posterior margin glabrous, impunctate; small median area of propleura finely punctate and pubescent, the surrounding area coarsely punctate; mesopleura with large distinct punctures throughout; metapleura glabrous, with fine scattered punctures, except ventrally with large, coarse punctures; sides of propodeum with very large, more or less confluent punctures, posteriorly the punctures becoming foveate; posterior face and dorsum of propodeum very coarsely, confluently, deeply foveate.

Abdomen ferruginous, clothed throughout with sparse, black, erect pubescence, except a pair of large obscure, subapical spots on the second tergite with inconspicuous yellowish pubescence; first segment short, subsessile with the second; first tergite with scattered punctures throughout, except the apical margin closely punctate; second tergite with moderate, distinct punctures throughout; tergite 3–6 with moderate, close punctures; tergites 1–6, all with a fringe of long, black pubescence, that of tergite one thinner than those of 2–5; apical tergite very broad and short, the pygidial area occupying the apical third of the tergite but not well defined, the apical margin with a fringe of erect, black hairs; carina of first sternite not dentate, the sternite coarsely, closely punctate; second sternite with large, distinct, slightly elongate punctures, and a median, longitudinal crest of short, dense, erect, black hairs on the apical half, not extending to the apical margin; sternites 2–5 with small, scattered punctures, denser at the apical margin; sternites 2–5 with a thin apical fringe of black pubescence.

Legs dark mahogany red, clothed with sparse, black pubescence; calcaria black.

Wings dark fuliginous; cell 2nd R_1+R_2 broadly truncate at the apex; cell R_4 almost obsolete; vein M_{3+4} received by cell R_5 midway between the base and apex; veins r-m and R_5 widely separated on vein r; vein r-m conspicuously sinuate.

Holotype.—Male, Deep Lake, Florida, April 13, 1912, in collection of American Museum of Natural History.

This is closely related to *bexar* but may be recognized by being entirely ferruginous. It may prove to be only a variety of *bexar*. The genitalia of this species are identical with those of *asopus* and is therefore not figured.

GROUP FULVOHIRTA

The females have the mandibles bidentate; antennal scrobes carinate above; thorax short (broader than long in *fulvohirta* and *homole*, slightly longer than broad in *fulgida*), subhexagonal, and without a scutellar scale; pygidium rugose. The males have the first abdominal segment subsessile and the postero-lateral angles of the last sternite angulate or dentate.

9. DASYMUTILLA FULVOHIRTA (Cresson)

Plate 1. fig. 2

Mutilla californica Cresson, Proc. Ent. Soc. Phila., vol. 4, p. 432, 1865, female (part).—Fox, Trans. Amer. Ent. Soc., vol. 25, p. 248, 1899, female (part).—Melander, Trans. Amer. Ent. Soc., vol. 29, p. 302, 1903, female (part).

Mutilla fulvohirta Cresson, Proc. Ent. Soc. Phila., vol. 4, p. 433, 1865, male.—Dalle Torre, Cat. Hymen., vol. 8, p. 42, 1897, male.—Fox, Trans. Amer. Ent. Soc., vol. 25, p. 289, 1899, male.—Melander, Trans. Amer. Ent. Soc., vol. 29, p. 303, 1903, male.

Mutilla (Sphaerophthalma) californica Blake, Trans. Amer. Ent. Soc., vol. 3, p. 235, 1871, female (part).

Mutilla (Sphaerophthalma) fulvohirta Blake, Trans. Amer. Ent. Soc., vol. 3, p. 235, 1871, male.

Sphaerophthalma californica Blake, Trans. Amer. Ent. Soc., vol. 8, p. 219, 1886, female (part).

Sphaerophthalma fulvohirta Blake, Trans. Amer. Ent. Soc., vol. 8, p. 219, 1886, male.

Sphaerophthalma townsendi Cockerell, Ent. News, vol. 5, p. 199, 1894, male.

Mutilla townsendii Dalle Torre, Cat. Hymen., vol. 8, p. 92, 1897, male.—Fox, Trans. Amer. Ent. Soc., vol. 25, p. 289, 1899, male.

Ephuta californica var. *euchroa* Cockerell, Ann. & Mag. Nat. Hist. ser. 6, vol. 20, p. 513, 1897, female.—André, Gen. Ins., vol. 1, fasc. 11, p. 60, 1903, female.

Ephuta californica Cockerell, Proc. Dav. Acad. Nat. Sci., vol. 7, p. 139, 1898.

Ephuta townsendi Cockerell, Proc, Dav. Acad. Nat. Sci., vol. 7, p. 139, 1898. male.

Ephuta (Ephuta) fulvohirta André, Gen. Ins., vol. 1, fasc. 11, p. 60, 1903, male.

Ephuta (Ephuta) townsendi André, Gen. Ins., vol. 1, fasc. 11, p. 64, 1903. male.

Dasymutilla euchroa Mann, Psyche, vol. 22, p. 178, 1915.

Type.—Male, Colorado, in collection of American Entomological Society of Philadelphia. The type of *townsendi* Cockerell is in the collection of the American Entomological Society of Philadelphia; that of *euchroa* Cockerell is in the United States National Museum.

Distribution.—Texas, New Mexico, Arizona, California, Kansas, Colorado, Utah, Nevada, Nebraska, South Dakota, North Dakota, Wyoming, Idaho, Oregon, Montana, Alberta. (Fig. 3.)

The description of the female is as follows:

Female.—Black, the front, vertex, thorax above and abdomen above from the base of the second segment ochraceous; length, 13 mm.

Head black; mandibles acute at the apex, unidentate within about a third of their length from the tips; clypeus bidentate medially at the apical margin, the clypeal fringe composed of long, coarse, black hairs; first segment of flagellum twice as long as broad at the apex, apparently a little shorter than the second and third segments united; antennal scrobes distinctly carinate above; front and vertex with deep, coarse, confluent punctures, clothed with long, erect, and recumbent ochraceous pubescence; genae with large, more or less confluent punctures, not as coarsely sculptured as the front and vertex, rounded posteriorly, clothed with sparse, erect black pubescence; relative widths of head and thorax, 8.5–10.5.

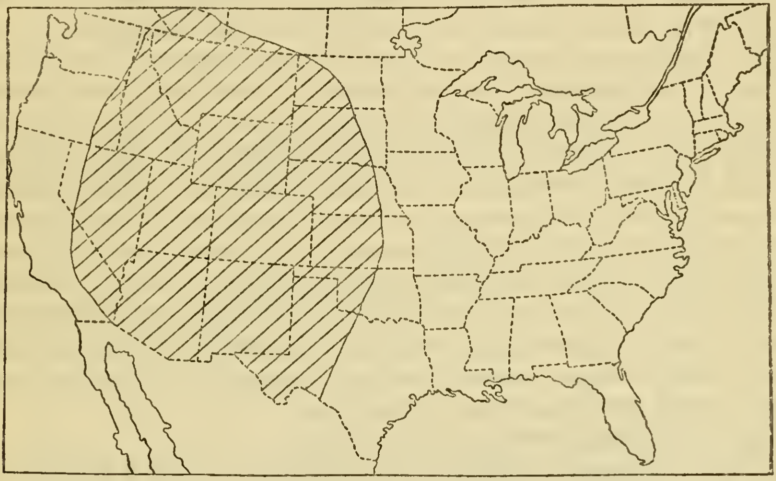

FIG. 3.—DISTRIBUTION OF DASYMUTILLA FULVOHIRTA (CRESSON)

Thorax black; dorsum with large, coarse, deep, more or less confluent punctures, clothed with long, erect, and recumbent, ochraceous pubescence, extending onto the posterior face of the propodeum; propleura with large, coarse, deep punctures, the carina defining the cephalic margin prominent, sparsely clothed with erect, black pubescence; anterior half of mesopleura with fine punctures near the cephalic margin and large scattered punctures posteriorly, the posterior half of the mesopleura with coarse, deep, confluent punctures, clothed with sparse, erect, black pubescence; metapleura glabrous with a few, large, shallow punctures ventrally, very sparsely clothed with long, black pubescence; sides of propodeum with large, more or less confluent punctures anteriorly, becoming foveately reticulate, posteriorly, very sparsely clothed with long, black pubescence; posterior face of propodeum coarsely, foveately reticulate at the sides and above, glabrous with scattered punctures medially, and closely, finely punctate ventrally, the dorsal margin clothed with long, ochraceous pubescence like that of the dorsum of the thorax, the remainder clothed with sparse, long, erect, black pubescence; scutellar scale not present.

Abdomen black; first segment short, subsessile with the second; first tergite with large, elongate punctures throughout, sparsely clothed with very long, erect, black pubescence; second tergite with large, deep more or less confluent punctures throughout, the punctures deeper and more confluent near the base, a small area at the lateral basal margins glabrous, impunctate; tergites 3–5 with moderate, more or less confluent punctures; extreme base of second tergite with sparse, erect black pubescence, the remainder of the second tergite and tergites 3–5 with long, erect and recumbent, ochraceous pubescence; base of tergite 6 with long, erect, black pubescence; pygidium irregularly rugose, more or less granulate apically; first sternite medially with a longitudinal ridge, but not sharply carinate, moderately punctate throughout, sparsely clothed with long, erect, black pubescence; second sternite with large, rather close, elongate punctures throughout, sparsely clothed with long, erect, black pubescence, and an apical fringe of long black hairs; sternites 3–5 with close, moderate, punctures throughout, sparsely clothed with erect, black pubescence, and each with an apical fringe of black hairs; apical sternite closely punctate, especially at the base and sides, clothed with erect, black pubescence.

Legs black, clothed with long black hairs.

Allotype.—Female, Colorado, in collection of United States National Museum.

SPECIMENS EXAMINED

Alberta, Canada: Female, Medicine Hat, July 12, 1923; female, Medicine Hat, August 1, 1916 (Sladen); female, 4 males, Medicine Hat August 20, 1916 (Sladen); 2 females, Medicine Hat, August 23, 1919 (Sladen); male, Medicine Hat, August 24, 1922 (F. S. Carr); female, Lethbridge, July 22, 1916 (Sladen); female, male, Lethbridge, July 28, 1916 (Sladen); male, Lethbridge, August 28, 1916 (J. B. Wallis).

Arizona: Male, Carr Canyon, Huachuca Mountains, Cochise County, August, 1905 (H. Skinner); female, Huachuca Mountains, May 12, 1919 (R. D. Camp); male, Fort Grant, Pinaleno Mountains, July 18, 1917; male, Tucson, June 5, 1919; female, Douglas, September 20, 1922 (H. Letcher); 2 males, Sabino Canyon, Santa Catalina Mountains, May 20, 1919; male, Hot Springs, July 2, 1902 (Oslar); female, Hot Springs (Oslar); female, Winslow, July 31 (Barber and Schwarz); female, Williams, June 30 (Barber and Schwarz); female, Williams, July 9 (Barber and Schwarz); male, Williams, July 29 (Barber and Schwarz); female, Ashfork, April 1 (Cockerell); female, Flagstaff, July 6 (Barber and Schwarz); female, Flagstaff, July 7 (Barber and Schwarz); male, Flagstaff, July 13, 1892;

female, Flagstaff, July 23, 1904; female, Flagstaff, July 25; female, Grand Canyon, July 7, 1892, female, Grand Canyon, July 24; female, Grand Canyon (Wickham); female, 2 males, Humboldt, August 1–4 (Kusche); female, Oak Creek Canyon, July (F. H. Snow); female, Palmerlee, August 1 (H. A. Kaeber); 3 females, 3 males.

California: Female, Mojave Desert (Ehrhorn).

Colorado: Male, Julesburg, April, 1899; male, Lamar, October 2, 1899; female, Bent County, July 13 (Lantz); male, Bent County, August 23 (Lantz); 8 females, 2 males, Bent County, August 29; male, La Junta, July 11, 1899; female, La Junta, July 22–23, 1919 (Rehn and Hebard); 2 males, La Junta, August 3; female, La Junta, August 30; female, Otero County, August 30; female, Virginia Dale, June 24 (F. C. Bishopp); male, Virginia Dale, July 26, 1901; male, Virginia Dale, August 13, 1903; female, Virginia Dale, September 3, 1899; female, Livermore, July 8, 1900; male, Livermore, July 13, 1900; female, Fort Collins, April 29, 1901; female, Fort Collins, May 2, 1900; female, Fort Collins, May 3, 1900; female, Fort Collins, May 8, 1903; female, Fort Collins, May 20, 1903; female, Fort Collins, June 1, 1898; 3 females, Fort Collins, June 5, 1899; female, Fort Collins, June 7, 1899; female, Fort Collins, June 13, 1903; female, Fort Collins, June 19, 1902; female, Fort Collins, June 22, 1898; female, Fort Collins, June 22, 1904; female, Fort Collins, June 23, 1903; 2 females, Fort Collins, June 29, 1901; female, Fort Collins, July 17, 1900; female, Fort Collins, July 20, 1900; female, Fort Collins, July 30, 1902; female, Fort Collins, August 10, 1907; female, Fort Collins, August 17, 1898; female, Fort Collins, August 23, 1899; female, Fort Collins, August 24, 1899; female, Fort Collins, September 17, 1900; female, Fort Collins, October 1, 1905; 2 males, Golden, August 9, 1898; female, Boulder, July 16, 1908 (G. von Krakow); female, Boulder (Cockerell); female, Boulder (Cockerell); male, Valmont Buttes, July 13, 1908 (G. von Krakow); male, Denver, August 7, 1904 (Oslar); male, Denver, September 19, 1901; male, Monument Park, July 19, 1877; female, Manitou, July 26, 1906; 2 females, Colorado Springs, June 15–30, 1896 (H. F. Wickham); male, Colorado Springs, July 20–26, 1896 (H. F. Wickham); female, Colorado Springs, August 12, 1903 (W. M. Wheeler); female, Colorado Springs, August 21, 1924 (A. G. V.); male, Colorado Springs, October 10; male, Florence, October 12, 1894; male, Trinidad, July 13, 1899; male, Platte Cañon, July (Oslar); female, Florissant, June 24, 1914; male, Clear Creek, July 12; male, Clear Creek, August 27, 1902 (Oslar); male, Estes Park, August, 1892 (F. H. Snow); 2 females, Buena Vista, July 1–6, 1896 (H. F. Wickham); female, South Park, August 19, 1905 (Oslar); 2 males, Salida, July 12, 1898; 2 females, 3 males, Salida, July 20 (Lantz); male, Salida, July 24, 1900; female, Salida, July 28 (Lantz); male, Salida (Wickham); 2 females, male, Gardner, June 20–August 10, 1918; 2 females, Fremont County, September 5; female, Ute Creek, July 2 (H. S. Smith); 2 females, Ute Creek, July 3 (L. Bruner); 8 females, Ute Creek, July 5; female, Ute Creek, July 9 (R. W. Dawson); 2 females, Ute Creek, July 13 (H. S. Smith); male, Ute Creek, July 19 (H. S. Smith); 2 females, Ute Creek, August 15 (R. W. Dawson); 2 females, Antonito, August 5, 1899; female, Antonito, August 5, 1900; 3 males, Pagosa Springs (Baker); 2 females, male, Rifle, July 25, 1900; female, Alder, August 25, 1899; female, Delta, September 23, 1901; male, Ridgway, July (Oslar); 2 females, Durango, May 25, 1900 (Oslar); female, male, Durango, May 30, 1900 (Oslar); 2 females, Durango, June 23, 1900 (Oslar);

male, Durango, June 30, 1900 (Oslar); 2 females, Durango, July 4, 1900 (Oslar); female, Durango, July 7, 1900 (Oslar); 2 females, Durango, July 20, 1900 (Oslar); 2 females, Durango, July 21, 1900 (Oslar); female, Durango, July 23, 1900 (Oslar); female, Durango (Oslar); 3 females, 2 males, Dolores, August 2, 1900; female, Westlake, July 7, 1900; 2 females, Nephista, August 6, 1900; 2 females, Dixon Cañon, April 11, 1900; female, Kenosha Pass, August (Oslar); female, Copeland Lake, June 22 (Cockerell); female, Chenney Gulch, May 13, 1901 (Dyar and Caudell); 3 females, 2 males (Popenoe); 2 females (Snow); 23 females, 16 males.

IDAHO: 2 females, Boise City; female, Soda Springs.

KANSAS: Female, Medora (W. Knaus); male, Nickerson, August 5, 1910; female, Great Spirit Spring, Mitchell County; male, Phillips County, August 30, 1912 (F. X. Williams); male, Norton County, August 23, 1912 (F. X. Williams); female, male, Graham County, August 16, 1912 (F. X. Williams); female, Ness County, July 5, 1912 (F. X. Williams); 5 females, Clark County, August 23, 1911 (F. X. Williams); female, Gove County, July 1, 1885; female, Logan County (F. X. Williams); male, Grant County, July 23, 1911 (F. X. Williams); female, Grant County, July 27, 1911 (F. X. Williams); female, 5 males, Cheyenne County (F. X. Williams); female, male, Wallace County (F. X. Williams); female, Wallace County, July 7; 2 females, Wallace County (F. H. Snow); 3 females, Hamilton County, August 27; female, Hamilton County, August 28; female, Hamilton County, June, 1902 (F. H. Snow); female, Morton County, August 5, 1911 (F. X. Williams); male, western Kansas (Popenoe); 4 females, 2 males (Snow); male, July; 2 females.

MONTANA: Female, Powderville, August, 1916; 2 females, Custer, August 10, 1912; 2 males, Huntley, July 19, 1917; male, Huntley, July 23, 1917; female, Billings, July 12, 1904; male, Billings, July 16, 1904; 2 males, Billings, July 20, 1904; 2 females, Billings, July 30, 1910; 2 females, male, Billings, September 15, 1912; female, Columbus, September 8, 1905; female, Crazy Mountains, June 10, 1919; female, Livingston, July 29, 1903; 2 males, Piedmont, August 8, 1913; 3 males, Renova, July 26, 1918; male, Armstead, July 11, 1918; 3 females.

NEBRASKA: Male, Lincoln, August; male, McCook, July, 1903 (M. H. Swenk); male, Haigler, July 4, 1911 (J. T. Zimmer); male, Kimball, August 5, 1899; male, Gering, August; female, Mitchell, June 24, 1916 (C. E. Mickel); female, Mitchell, August 24, 1913 (L. M. Gates); male, Pine Bluffs, August 27, 1893; male, Glen, August 20, 1906 (H. S. Smith); 2 males, Harrison, August 4, 1908 (C. H. Gable); male, Harrison, August 4, 1908 (R. W. Dawson); 4 males, Harrison, August 9, 1908 (R. W. Dawson); 4 males, Harrison, August 9, 1908 (C. H. Gable); male, Harrison, August 12, 1912 (E. J. Taylor); male, Harrison, August 12, 1912 (R. W. Dawson); male, Harrison, August 20, 1912 (R. W. Dawson); female Monroe Canyon, Sioux County, June 25, 1911 (R. W. Dawson); female, Warbonnet Canyon, Sioux County, June 16, 1901 (M. Cary); female, Pine Ridge, July; 2 females, Sioux County.

NEVADA: 5 females.

NEW MEXICO: Male, Springer, July 9, 1909 (C. N. Ainslie); 5 females, male, Springer (C. N. Ainslie); female, Cimarron, August 17–22, 1914, W. R. Walton); female, Cimarron (Wm. T. Davis); 2 females, male, Koehler, August 12, 1914 (W. R. Walton); male, Koehler (W. R. Walton); female, Koehler (D. J. Caffery); 2 females, Koehler, August (H. F. Wickham);

female, Koehler (H. F. Wickham); female, Koehler (G. E. Pitts); male, Albuquerque, August, 1894 (F. H. Snow); male, Albuquerque; female, Las Vegas, July 21, 1902 (Oslar); female, Las Vegas, July 22, 1902 (Oslar); female, Pecos, August 27 (Cockerell); female, Magdalena; 2 males, Magdalena Mountains, August, 1894 (F. H. Snow); male, Alamogordo, July, 1907 (Rehn and Hebard); male, Rio Ruidoso, White Mountains, July 23 (Townsend); female, Arrayo Pecos river, July 21 (Oslar); 2 females, Jemez Springs, March 9, 1916 (John Woodgate); female, Jemez Springs, March 16, 1916 (John Woodgate); female, Jemez Springs, March 22, 1916 (John Woodgate); female, Jemez Springs, March 26, 1916 (John Woodgate); female, Jemez Springs, May 2, 1916 (John Woodgate); 2 females, Jemez Springs, May 28, 1913 (John Woodgate); female, Jemez Springs, July 9, 1916 (John Woodgate); male, Jemez Springs, August 25, 1916 (John Woodgate); male, Jemez Springs, September 3, 1916 (John Woodgate); female, Fort Wingate, June 27, 1908 (John Woodgate); female, Fort Wingate, July 6, 1909 (John Woodgate); female, Fort Wingate, July 16, 1908 (John Woodgate); female, Fort Wingate, July 16, 1909 (John Woodgate); male, Fort Wingate, July 19, 1909 (John Woodgate); female, Fort Wingate, July 22, 1909 (John Woodgate); 2 females, Fort Wingate, July 24, 1909 (John Woodgate); male, Fort Wingate, July 31, 1909 (John Woodgate); male, Fort Wingate, August 16, 1908 (John Woodgate); female, Coolidge (Wickham); 2 females, Aztec, April 24, 1899; 5 females, male, Aztec; female, male.

North Dakota: 16 males, Medora, August 3, 1923 (O. A. Stevens); female, Beach, August 29, 1923 (C. N. Ainslie).

Oregon: Female, Crooked River, June 23, 1906; 2 females.

South Dakota: Female, Hot Springs, July 5, 1924.

Texas: Female, male, Alpine, June 28–30 (H. F. Wickham); female, Alpine, July 20–22 (H. F. Wickham); female, College Station, May 29, 1919 (H. J. Reinhard); female, Cherry Canyon, Davis Mountains, July 8, 1916 (F. M. Gaige); female.

Utah: 2 females, Sierra la Sal Mountains, July 20, 1920 (Henry Skinner); female, Emery County, July 21, 1921 (Grace O. Wiley); female, Emery County, September 5, 1921 (Grace O. Wiley); 2 females, Richfield, August 7, 1904; male, Leamington, July 19, 1918 (Henderson and King); 2 males, Leamington, July 20, 1918 (G. E. King); female, Vineyard, May 20 (Tom Spalding); female, Vineyard, July 5 (Tom Spalding); female, Vineyard, July 11 (Tom Spalding); female, Eureka, May 16, 1921 (Tom Spalding); female, Eureka, June 14, 1921 (Tom Spalding); 2 females, Eureka, June 19 (Tom Spalding); female, Eureka, June 20, 1920 (Tom Spalding); male, Provo, North Fork Canyon, July 30 (Tom Spalding); female, American Fork, August 24, 1903; male, Salt Lake City, August 24, 1917; female, male, Salt Lake City; female, Coalville, August 23; female, Ogden, April 30, 1907; female, Logan, April 17, 1905; female, Logan, May 12, 1907 (E. G. Titus); female, Logan, May 20, 1921 (G. E. King); female, Logan, June 28, 1904; female, Logan, June 29, 1912; female, Logan, July 13, 1925; female, Logan, July 14, 1906; female, Logan, August 5, 1903; 2 females, Logan, August 8, 1926 (A. C. Burrill); female, Logan, August 14, 1926 (A. C. Burrill); female, Logan, August 16, 1925 (A. C. Burrill); female, Logan, August 18, 1925 (A. C. Burrill); female, Logan, September 22, 1921 (G. E. King; female, Spring Canyon, August 28, 1925 (G. F. Knowlton); 4 females, 2 males, Logan; 2 females, Smithfield, June 12; female, Wellsville, July 29, 1903; female, Cache Junction, June 3, 1912 (H. R. Hagan); 2 females, southern Utah; male.

WYOMING: Female, Hecla (Clason); female, Laramie, August 5, 1920 (Henry Skinner); 2 males, Laramie Mountains, August, 1895; male, Carbon County; 2 females, 2 males, Douglas; 2 females, Worland, August 1, 1911 (L. Bruner); 2 females, 40 miles north of Lusk, July, 1895; female, Crow Heart Butte, August 27, 1896 (R. P. Currie); female, Dry Creek, August 28, 1896 (R. P. Currie); female, Yellowstone Park, August, 1906 (H. Skinner); female.

Both the males and females of this species vary in length from 8 to 14 mm., and in color of pubescence from pale yellow to crimson. The variations either in size or color are not confined to any particular geographical area, but occur uniformly throughout the entire range of the species.

The female has heretofore been known as *californica*, based on Cresson's identification in 1865. Cresson also suggested that *fulvohirta* was probably the male of *californica*. This female is certainly not *californica*, since it neither agrees with Radoskowski's description and figure of that species nor, with one exception, is it represented by any specimens from California, the locality given by Radoskowski for his species.

In August, 1925, Dr. Francis Long sent me two specimens of Mutillidae, a male and a female which had been reared from the cells of *Anthophora occidentalis*. They proved to be the two sexes of *fulvohirta*. Later, in November, 1925, Charles H. Hicks sent me the remains of two specimens of Mutillidae, a male and female, which had been collected from the cells of *Anthophora occidentalis*. These also proved to be *fulvohirta*. On the basis of this biological evidence, and from the fact that the geographical distribution of the male and female under consideration here coincide, I have united these as the two sexes of one species.

I have examined the type of *townsendi* Cockerell and find it to be identical with the type of *fulvohirta* except in the color of the pubescence, which a large series of specimens has shown to be quite variable. *Euchroa* Cockerell is the female form of *fulvohirta* with the pubescence of a deep crimson color. Specimens with the pubescence colored thus occur throughout the entire range.

The male of this species is characterized by a wide median longitudinal row of short hairs on the second abdominal sternite, a character not mentioned in the original description. This row of hairs is slightly basad on the median transverse line of the sternite.

10. DASYMUTILLA HOMOLE, new species

Female.—Very dark mahogany red, almost black; the vertex, dorsum of thorax, and disk of second abdominal tergite clothed with fulvous pubescence; thorax as broad, or very slightly broader than long; pygidium irregularly rugose; length, 9.5 mm.

Head very dark mahogany red; clothed throughout with long, appressed and erect pubescence, that of the vertex fulvous, the remainder black; mandibles acute at the apex, unidentate within near the apex (one-fourth the total length of the mandible, from the tip); anterior margin of clypeus distinctly bidentate medially; anterior half of clypeus glabrous, impunctate; posterior half of clypeus finely, densely punctate, clothed with long, black pubescence forming the clypeal fringe; scape indistinctly punctate, clothed with coarse, black hairs; first segment of flagellum twice as long as it is broad at the apex, equal in length (ventrally) to segments two and three united; antennal scrobes carinate above; front, vertex and genae coarsely, more or less confluently punctate; relative widths of head and thorax, 7.25–8.5.

Thorax very dark mahogany red, as broad as, or very slightly broader than long; dorsum clothed with long, appressed and erect, fulvous pubescence, the remainder clothed with sparse, long, erect, black pubescence; dorsum coarsely, foveately, more or less confluently punctured; scutellar scale absent; propleura coarsely, contiguously punctate; anterior half of mesopleura with fine, scattered punctures anteriorly, moderate, scattered punctures posteriorly; posterior half of mesopleura with coarse, confluent punctures throughout; metapleura glabrous, impunctate, except for scattered, moderate punctures on the ventral third, and large, contiguous punctures at the ventral margin; sides of propodeum with scattered, moderate punctures, the punctures coarser and closer toward the posterior margin; sides and dorsal half of posterior face of propodeum shallowly, foveately punctured, the disk of the ventral half depressed and moderately, indistinctly punctate.

Abdomen dark mahogany red, clothed with long, appressed and erect, black pubescence, except the disk of the second abdominal tergite clothed with long, appressed and erect, fulvous pubescence; apical fringe of second tergite black; first segment short, subsessile; the first tergite with coarse, contiguous punctures; narrow basal margin of second tergite glabrous, impunctate, sides of tergite with large, coarse, contiguous punctures, the disk with smaller, close punctures; tergites 3–5 with close, moderate punctures; basal two-thirds of pygidium irregularly rugose, the apical third granulate; median carina of first sternite somewhat prominent, but not dentate, the sternite closely punctured; second sternite slightly gibbose medially at the base, the disk with moderate, separated punctures, the sides and apical margin with coarse, contiguous punctures; sternites 3–5 with coarse, contiguous punctures.

Legs dark mahogany red, sparsely clothed with long, black pubescence; calcaria black.

Holotype.—Female, Cat. No. 40720, U.S.N.M., Dripping Springs, Organ Mountains, New Mexico.

Paratype.—Female, Parker's Well, base of Organ Mountains, New Mexico, in collection of University of Minnesota; female, without data, author's collection.

This species is very closely related to *fulvohirta* Cresson. It differs from that species in the second abdominal tergite being somewhat more coarsely punctate than in *fulvohirta* and in having the pubescence of the apical abdominal tergites beyond the second, clothed with black pubescence. The paratypes are 8.5 mm. and 10 mm. in length, and the fulvous pubescence of the second tergite extends posteriorly onto the median area of the third and fourth tergites in both.

11. DASYMUTILLA VANDALA, new species

Male.—Black, the apical half of the second abdominal tergite, tergites 3–6 entirely and base of ultimate tergite clothed with orange-yellow pubescence; apical fringes of sternites 2–5 yellow; second sternite without a median pit or a row of hairs simulating a carina; first segment of abdomen subsessile. Length, 10 mm.

Head black, clothed throughout with long, sparce, erect, black pubescence; mandibles acute at the apex, the inner margin bidentate near the apex; clypeus bidentate medially on the cephalic margin; disk of clypeus densely punctate; scape bicarinate beneath, coarsely punctate above; first segment of flagellum slightly shorter than the second; antennal scrobes carinate above; front densely, more or less confluently punctate; vertex and genae with sparse, moderate punctures; relative widths of head and thorax, 7–9.

Thorax black, clothed throughout with long, sparce, erect, black pubescence; pronotum not emarginate medially; pronotum, mesonotum and scutellum with large, contiguous, somewhat confluent punctures; the propleura dorsally and anteriorly punctured like the pronotum, posteriorly with fine punctures and scattered moderate punctures; mesopleura with large, contiguous punctures, except the anterior and posterior margins with the punctures sparse and scattered; metapleura glabrous, impunctate except for large, scattered punctures on the ventral half; sides of propodeum with foveate, contiguous punctures except the anterior margin with punctures sparse; posterior face and dorsum of propodeum coarsely foveately reticulate; tegulae glabrous, impunctate except for setigerous punctures on the basal and inner lateral margins.

Abdomen black; apical half of tergite two, tergites 3–6 entirely and base of ultimate tergite clothed with long, erect, orange-yellow pubescence; sternites 2–4 with a very thin apical fringe of orange-yellow pubescence; first segment of abdomen subsessile; first tergite with large, close punctures laterally and apically, and with a thin apical fringe of orange-yellow pubescence; second tergite with moderate, separated punctures, the punctures larger and closer at the base and sides; tergites 3–6 with moderate, contiguous punctures; ultimate tergite without an apical fringe of hairs, the pygidial area glabrous, impunctate; first sternite punctate and with a median longitudinal carina; second sternite with large, scattered punctures, the latter very sparse medially, without any median pit or longitudinal row of hairs simulating a carina; sternites 3–6 with scattered punctures near the apical margin; postero-lateral angles of ultimate sternite angulate or dentate, and the apical margin angularly produced medially.

Legs black, sparsely clothed with long, black pubescence; calcaria black.

Wings dark fuliginous; cell 2nd R_1+R_2 somewhat rounded at the apex; cell R_4 almost obsolete; vein M_{3+4} received by cell R_5 very close to the base, about one-fifth the distance from the base to the apex; veins r–m and R_5 widely separated on vein r.

Holotype.—Male, Pecos River, Sheffield, Texas, July 4, 1917, in collection of Cornell University.

This species is very closely related to *fulvohirta* Cresson. It differs from the latter in lacking the longitudinal row of hairs on the second sternite and in having the head and thorax clothed entirely with black pubescence. The form of the head, thorax and first abdominal segment is identical with that of *fulvohirta*. The genitalia are like those of *fulvohirta* and are therefore not figured.

12. DASYMUTILLA COTULLA, new species

Male.—Head and thorax black, clothed with black pubescence; abdomen black, apical half of tergite two, and the following tergites clothed with fulvous pubescence; first abdominal segment subsessile; first segment of flagellum distinctly shorter than the second; second sternite with a deep, median pit, closely filled with hairs. Length 13 mm.

Head black, clothed with long, erect and recumbent, black hairs; mandibles tridentate; clypeus strongly bidentate medially, the apical half, closely and confluently punctate; scape sparsely punctured and clothed with coarse, black hairs; first segment of flagellum distinctly shorter than the second, antennal scrobes distinctly carinate above; front and vertex coarsely and confluently punctate; genae with small, separated punctures; relative width of head and thorax, 6.5–8.

Thorax black, clothed with long, erect and recumbent black hairs; pronotum, mesonotum, scutellum, and metanotum coarsely, deeply and confluently punctate; pronotum without an emargination medially; propleura coarsely punctate throughout; mesopleura coarsely punctate throughout, the punctures scattered on the anterior half, close and confluent on the posterior half; metapleura smooth and shining with a few scattered punctures ventrally; sides of propodeum shallowly and broadly reticulate; dorsum and posterior face of propodeum shallowly and broadly reticulate; tegulae smooth and shining except for punctures along the basal margins.

Abdomen black; first segment subsessile, the ventral carina not produced anteriorly into a prominent tooth, the tergite closely, confluently punctate along the posterior margin, glabrous and with large, scattered punctures elsewhere; second tergite with large, more or less confluent punctures throughout, the basal half of the tergite clothed with long, black hairs, the posterior half clothed with long, fulvous hairs; tergites 3–6 with close, large punctures, clothed with long, fulvous hairs; last tergite as broad as long, smooth and shining, with a fringe of long, fulvous hairs at the base; second sternite with scattered, large, elongate punctures, a deep pit, closely packed with fine hairs, occupying the median area; sterites 3–6 punctate near their apical margin, each with a fringe consisting of long, black hairs at the middle and long, fulvous hairs at the sides; last sternite punctate; dentiform at the posterior lateral angles.

Legs very dark red, clothed with black hairs. Calcaria black.

Wings dark fuliginous; veins r–m and R_5 widely separated on vein r.

Holotype.—Male, Cat. No. 40721, U.S.N.M. Cotulla, Texas, November 26, 1905 (F. C. Pratt).

This species is related to *fulvohirta* and *vandala* but differs from both in having a deep, median pit on the second sternite. The shape of the head and thorax, the form of the first abdominal segment and of the last sternite indicate the affinities quite clearly. The genitalia of the type specimen are lost and their exact structure is not known, but it is probable that they are identical with those of *fulvohirta.*

13. DASYMUTILLA FULGIDA, new species

Female.—Dark mahogany red beneath, reddish testaceous above, clothed above with rather dense, long, erect and suberect bright crimson pubescence; antennal scrobes strongly carinate above; posterior margin defined by a prominent irregular carina; thorax subhexagonal, slightly longer than broad; scutellar scale absent; first abdominal segment subsessile; pygidium rugose. Length, 12 mm.

Head mahogany red; mandibles acute at the apex, apical two-thirds black, basal third ferruginous; clypeal fringe of long, black hairs; scape punctured, sparsely clothed with coarse, dark hairs; first segment of flagellum slightly less than twice as long as it is broad at the apex; antennal scrobes strongly carinate above; front and vertex with very large, coarse deep punctures, almost reticulate, clothed with erect and recumbent, long, brilliant crimson pubescence; genae coarsely punctured like the front and vertex, their posterior margins defined by a prominent irregular carina, clothed with sparse, black, erect pubescence; relative widths of head and thorax, 7.5–9.

Thorax mahogany red, except the dorsum reddish testaceous; dorsum deeply and coarsely reticulate, clothed with long, erect and recumbent, brilliant crimson pubescence; propleura closely punctured; very sparsely clothed with long, mixed black and pale red pubescence; anterior half of mesopleura with separated shallow punctures, sparsely clothed with short pale recumbent pubescence, posterior half very coarsely, confluently punctured, clothed with long, erect, black pubescence; dorsal half of metapleura glabrous, impunctate, the ventral half with large, close, shallow punctures, very sparsely clothed with long, black pubescence; sides and posterior face of the propodeum deeply and coarsely reticulate, sparsely clothed with long, erect, black pubescence, except the dorsal third of the posterior face clothed with crimson pubescence like that of the dorsum; scutellar scale entirely absent.

Abdomen beneath, the first tergite, and basal and lateral margins of second tergite mahogany red, remainder of abdomen above reddish testaceous; first segment very short, subsessile; first tergite closely and deeply punctured throughout, sparsely clothed with long, black, erect pubescence and an apical fringe of black pubescence; second tergite coarsely punctate on the basal and lateral margins, the disk deeply and coarsely reticulate; clothed with long, erect and recumbent, brilliant crimson pubescence; a small medial spot of black pubescence at the apical margin of the second tergite; tergites 3–5 closely, confluently punctate, the punctures small and shallow; basal margin of last tergite clothed with long, reddish pubescence; pygidial area irregularly rugose tending to longitudinally rugose; first sternite strongly keeled, the keel not toothed, sparsely clothed with long, erect, black pubescence; second sternite with deep, separated punctures, those at the sides larger and deeper than those on the disk; sternites 3–5 very closely and confluently punctate; sternites 2–5 sparsely clothed with long, erect, black pubescence and each with an apical fringe of black pubescence.

Legs mahogany red, clothed with long, mixed pale and black pubescence; calcaria dark.

Holotype.—Female, Oak Creek Cañon, Arizona, August (F. H. Snow), in collection of University of Kansas.

Paratypes.—Two females, Oak Creek Cañon, Arizona, August (F. H. Snow), 4 females, southern Arizona, August, 1902 (F. H. Snow), in collections of the University of Kansas, the University of Minnesota, and the author.

Superficially this species resembles the female of *fulvohirta;* however, the sculpturing of the genae is very much coarser than in that species, and the genae are bounded posteriorly by a carina; the sculpturing of the dorsal surface of the thorax and abdomen is also much coarser than in *fulvohirta*, and the color of the integument above is reddish testaceous, while the pubescence above is uniformly of a brilliant crimson color.

GROUP THETIS

Including a single species, female, in which the thorax is subhexagonal, broader than long, and with scutellar scale absent; pygidium striate.

14. DASYMUTILLA THETIS (Blake)

Sphaerophthalma thetis Blake, Trans. Amer. Ent. Soc., vol. 13, p. 214, 1886, female.

Mutilla thetis Dalle Torre, Cat. Hymen., vol. 8, p. 91, 1897, female.—Fox, Trans. Amer. Ent. Soc., vol. 25, p. 246, 1899, female.

Ephuta (Ephuta) thetis André, Gen. Ins., vol. 1, fasc. 11, p. 64, 1903, female.

Type.—Female, Arizona, in collection of Entomological Society of Philadelphia.

Distribution.—Arizona.

SPECIMENS EXAMINED

Arizona: Female, Florence (Biederman); female, Sacaton, July 26, 1924 (J. A. Harris, Jr.); female, Nogales, June 21, 1903 (Oslar); female, Nogales, June 25, 1903 (Oslar); female, Baboquivaria Mountains (F. H. Snow).

The following characters were not mentioned in the original description; no carina between the antennal tubercles and the margins of the eyes; genae rounded posteriorly; thorax not longer than broad; scutellar scale absent; a very few scattered black hairs at the median apical margin of the first abdominal tergite, and the median basal margin of the second abdominal tergite (these are so inconspicuous that I have regarded this species as "entirely clothed with white hairs" in the key); pygidium very distinctly longitudinallly striate. *Thetis* is very similar in general appearance to *gloriosa* but is easily distinguished from the latter by the characters mentioned above.

Group SCABRA

Females with antennal scrobes strongly carinate above, thorax distinctly broader than long, scutellar scale absent, first abdominal segment subsessile, pygidium longitudinally rugose, second abdominal sternite strongly scabrose at the sides and subapically. Males with the second abdominal sternite decidedly concave medially, slightly scabrous at the sides and subapically, and trochanters produced at the apex into a prominent tooth.

15. DASYMUTILLA SCABRA (Fox)

Sphaerophthalma scaber Fox, Proc. Calif. Acad. Sci., ser. 2, vol. 4, p. 94, 1894, female.

Mutilla scabra Dalle Torre, Cat. Hymen., vol. 8, p. 84, 1897, female.—Fox, Trans. Amer. Ent. Soc., vol. 25, p. 247, 1899, female.

Ephuta (*Ephuta*) *scabra* André, Gen. Ins., vol. 1, fasc. 11, p. 63, 1903, female.

Type.—Female, San Jose del Cabo, Lower California, October (G. Eisen), in collection of California Academy of Sciences?

Distribution.—Lower California.

SPECIMENS EXAMINED

Lower California: Female, Truinpo, July 10, 1919 (Ferris).

16. DASYMUTILLA EMINENTIA, new species

Plate 1, fig. 3

Male.—Black, clothed with very pale yellowish pubescence; length 12 mm. Head black; front and vertex with erect and recumbent pale yellowish pubescence; mandibles tridentate, ferruginous with the tips black; clypeus bidentate medially at the apex, finely rugose, sparsely clothed with dark hairs; scape sparsely clothed with mixed pale and dark hairs; first segment of flagellum shorter than the second; antennal scrobes distinctly carinate above; front, vertex, and genae with moderate, close, shallow punctures; relative widths of head and thorax, 7–9.

Thorax black, the pronotum, mesonotum, scutellum, metanotum, and tegulae clothed with erect and recumbent pale yellowish pubescence; pronotum, mesonotum, and scutellum with large, shallow confluent punctures; propleura with moderate, scattered punctures; sparsely clothed with pale hairs; mesopleura with moderate, shallow punctures, clothed with sparse, dark hairs; metapleura glabrous, with a few scattered punctures; propodeum coarsely reticulate throughout; tegulae glabrous, punctate at the base and inner lateral margin

Abdomen black, clothed throughout with pale yellowish pubescence, except the basal half of the second tergite, and the second sternite with black pubescence; first tergite shallowly punctate, except the apical margin rather deeply punctate, the pale pubescence very sparse; second tergite with small, more or less confluent punctures; tergites 3–6 with small, close, confluent punctures; last tergite weakly longitudinally rugose; first sternite without a distinct median carina; second sternite distinctly concave medially, with large scattered punctures on the disk, slightly scabrous at the sides and apical margin; sternites 3–7 with sparse, shallow punctures.

Legs black; clothed with pale hairs; the posterior trochanters produced at the apex within into a prominent blunt tooth.

Wings dark fuliginous; cell 2nd R_1+R_2 broadly truncate at the apex; cell R_4 almost obsolete; vein M_{3+4} received by cell R_5 about one-third the distance from the base to the apex; veins r–m and R_5 very widely separated on vein r.

Female.—Very dark reddish black, clothed with white pubescence; length, 12 mm. Head dark reddish black, clothed throughout with long, recumbent and erect whitish hairs; mandibles acute at the tip, a tooth within; clypeus bidentate medially at the apex, partially concealed by the clypeal fringe of long hairs; scape clothed with stiff whitish hairs; first joint of flagellum twice as long as its own width at the apex; antennal scrobes distinctly carinate above; front, vertex and genae with large, shallow, confluent punctures; relative lengths of head and thorax, 7–8.5.

Thorax very dark reddish black, as broad as it is long; metapleura and propodeum with sparse, black pubescence; remainder of thorax with recumbent and erect whitish pubescence; dorsum of thorax with very large, coarse punctures; propleura with large shallow punctures; the posterior margin bordered with a fringe of whitish hairs; mesopleura with scattered, shallow punctures on the anterior half, large, confluent punctures on the posterior half, the posterior margin bordered with a few dark hairs; metapleura glabrous with a few scattered, shallow punctures; sides and posterior face of propodeum coarsely reticulate.

Abdomen very dark reddish black; first segment short, coarsely punctured at the sides and posterior margin above, clothed above with sparse, long black hairs, below with pale hairs; basal margin of second tergite clothed with sparse black hairs, remainder of abdomen clothed with recumbent and erect very pale yellowish hairs; second tergite with large, coarse, almost confluent punctures throughout; tergites 3–5 with very close, moderate punctures; pygidial area strongly, longitudinally rugose; first sternite without any definite median carina; basal and median portion of second sternite weakly scabrose, the sides and posterior margin, however, very strongly scabrose; sternites 3–5 with moderate, confluent punctures throughout.

Legs very dark reddish, almost black, clothed with whitish hairs, calcaria dark.

Holotype.—Male, Tucson, Arizona (F. H. Snow), in collection of University of Kansas.

Allotype.—Female, Tucson, Arizona, July 12, 1924 (A. A. Nichol), in collection of University of Minnesota.

Paratypes.—Two females, Tucson, Arizona, May 16, 1903 (Oslar); female, Tucson, Arizona, May 18, 1903 (Oslar); female, Tucson, Arizona, July 12, 1924 (A. A. Nichol); female, 15 males, Tucson, Arizona (F. H. Snow); 2 females, San Xavier, near Tucson, Arizona, July 24, 1916; female, Santa Rita Mountains, Arizona (E. A. Schwarz); male, Santa Catalina Mountains, Arizona, September 10, 1924 (A. A. Nichol); female, Santa Catalina Mountains, Arizona, June 13, 1903 (Oslar); female, male, Baboquivaria Mountains, Arizona (F. H. Snow); female, Nogales, Arizona, June 25, 1903 (Oslar); female, Nogales, Arizona, June 27, 1903 (Oslar); female, Florence, Arizona, July 26, 1903 (C. R. Biedermann); male, Florence, Arizona (C. R. Biedermann); 2 females, Phoenix, Arizona; female, Hot Springs, Arizona, June 24 (Barber and Schwarz); female, Sacaton, Arizona, July 27, 1924 (J. A. Harris, Jr.); female, Sacaton, Arizona, July, 1923 (J. A. Harris, Jr.); female, Sacaton, Arizona, August 7, 1923 (J. A. Harris, Jr.); female, Sacaton, Arizona (C. N. Ainslie); in collections of United States National Museum, University of Arizona, University of Kansas, American Museum of Natural History, American Entomological Society of Philadelphia, Cornell University, University of Minnesota, and the author.

These are described as the male and female of one species on account of the fact that they resemble each other in general appearance, and because of the peculiar sculpturing of the second sternite in both sexes. *Scabra* and *furina* are the only other species that have the second abdominal sternite sculptured in this manner. As far as is known at present *scabra* is limited in its distribution to Lower California. *Furina* is very close to *eminentia* but is known only from Douglas, Arizona. The male of *eminentia* is quite remarkable on account of the sculpturing of the second sternite, and by having the posterior trochanters produced at the apex within into a prominent blunt tooth. The female may be distinguished from *scabra* by the fact that the metapleura, propodeum, first abdominal tergite, and basal margin of the second tergite are sparsely clothed with black hairs, while in *scabra* the entire insect is clothed with pale hairs except for a basal median spot on the second tergite.

The sculpture of the second sternite is the same in both species. The color of the pubescence in *eminentia* is not a pure white but is tinged with yellowish.

17. DASYMUTILLA FURINA, new species

Female.—Head and thorax ferruginous, the front, vertex and dorsum of thorax clothed with yellowish pubescence; abdomen very dark ferruginous, practically black; first tergite, basal and apical margins of second tergite and third tergite with black pubescence; remainder of second tergite, and tergites 4–5 with yellowish pubescence; apical fringes of abdominal sternites silvery; second abdominal sternite scabrous at the sides and subapically; pygidium rugose. Length, 12 mm.

Head ferruginous, the front and vertex clothed with somewhat dense, long, erect, yellowish pubescence; remainder of head with sparse, erect, pale pubescence; mandibles worn, the dentition not apparent; apical margin of clypeus feebly bidentate; clypeal fringe long, black; scape glabrous, with sparse, shallow punctures, clothed with sparse, pale hairs; first segment of flagellum subequal in length to segments two and three; antennal scrobes carinate above; front densely, coarsely, confluently punctate; vertex and genae with large, close, more or less confluent punctures, not as densely punctate as the front; relative widths of head and thorax, 7.75–9.

Thorax as broad as long, ferruginous; dorsum clothed with somewhat dense, long, erect, yellowish pubescence; pro- and mesopleura clothed with sparse, long, erect, pale pubescence; metapleura and propodeum with sparse, long, erect, black pubescence; dorsum of thorax densely, foveately punctate; scutellar scale absent; propleura with large, scattered punctures at the margins, finely punctate medially; anterior half of mesopleura sparsely punctate with intermixed large and small punctures; posterior half of mesopleura coarsely, confluently punctate; metapleura coarsely punctate ventrally, with sparse, small punctures medially, glabrous and impunctate dorsally; sides of propodeum glabrous, impunctate at the margin, coarsely, foveately punctate elsewhere; posterior face and dorsum of propodeum deeply, foveately reticulate.

Abdomen very dark ferruginous, almost black; first tergite, basal fifth and apical margin of second, and third tergite clothed with black pubescence; remainder of second tergite and fourth and fifth tergites with yellowish pubescence, the anterior margin of the yellow area on the second tergite emarginate medially; all the sternites sparsely clothed with long, erect, pale pubescence; the apical fringes of the sternites silvery; first segment subsessile with the second; first tergite closely, coarsely punctured; second tergite densely, foveately punctate; third tergite coarsely, confluently punctate; fourth and fifth tergites with small, separated punctures; pygidial area rugose; first tergite coarsely, confluently punctate, the median, longitudinal carina not well defined; second sternite scabrous at the sides and subapically, elsewhere shallowly foveate; sternites 3–5 densely, confluently punctate.

Legs dark ferruginous, sparsely clothed with long, pale pubescence; calcaria and tibial spines black.

Male.—Ferruginous, the head and thorax somewhat darker than the abdomen; clothed with sparse, somewhat appressed, pale golden pubescence on the head and thorax above and the abdomen from and including the apical half of the second tergite, the propodeum, basal half of second tergite, head beneath, and thorax on sides and beneath with sparse, black pubescence; disk of second abdominal sternite distinctly concave, scabrous at the sides and subapically; trochanters produced at the apex within into a prominent tooth. Length, 12 mm.

Head very dark ferruginous; front and vertex clothed with sparse, somewhat appressed, pale golden pubescence, elsewhere with sparse, erect, blackish pubescence; mandibles tridentate; apical margin of clypeus prominently bidentate medially; disk of clypeus densely, confluently punctate; scape bicarinate beneath, closely punctured above; first segment of flagellum distinctly shorter than the second dorsally, subequal ventrally; antennal scrobes carinate above; front and vertex coarsely, more or less confluently punctured; genae with moderate; close punctures, not as coarsely sculptured as the front and vertex; relative widths of head and thorax, 6.5–8.

Thorax very dark ferruginous, except the pronotum and propodeum lighter in color; pronotum, mesonotum, and scutellum clothed with long, somewhat appressed, pale golden pubescence, the remainder of the thorax with sparse, blackish pubescence; pronotum, mesonotum, and scutellum very coarsely, densely, confluently punctate; propleura confluently punctate at the margins, indistinctly punctate medially; mesopleura with large, distinct punctures on the anterior half and at the posterior margin, elsewhere the large punctures dense, somewhat confluent; metapleura glabrous, impunctate except for a few coarse, confluent punctures at the ventral margin; sides, posterior face and dorsum of propodeum coarsely, foveately reticulate; tegulae glabrous, impunctate, except the basal and inner lateral margins setigerously punctate.

Abdomen ferruginous; basal half of second tergite and basal third of apical tergite with sparse, appressed and erect black pubescence, elsewhere with sparse, pale golden pubescence; first segment subsessile; first tergite coarsely, confluently punctate, more densely so at the lateral and apical margins, second tergite with dense, elongate, confluent punctures; tergites 3–6 with dense, moderate punctures; pygidial area finely rugose; first sternite without a median longitudinal keel, coarsely, densely punctured; second sternite distinctly concave, the sides and apical margin scabrose; sternites 3–6 densely punctate at their apical margins; postero-lateral angles of last sternite angulate, dentiform.

Legs dark ferruginous, sparsely clothed with intermixed pale and black pubescence; posterior trochanters produced at the apex within into a prominent tooth; calcaria dark.

Wings fuliginous; cell 2nd R_1+R_2 broadly truncate at the apex; cell R_4 almost obsolete; vein M_{3+4} received by cell R_5 about one-third the distance from the base to the apex; veins r–m and R_5 widely separated on vein r.

Holotype.—Female, San Bernardino Ranch, Douglas, Arizona, August (F. H. Snow), in collection of University of Kansas.

Allotype.—Male, San Bernardino Ranch, Douglas, Arizona, August (F. H. Snow), in collection of University of Kansas.

Paratype.—Female, San Bernardino Ranch, Douglas, Arizona, August (F. H. Snow), in collection of University of Minnesota.

This species is closely related to *eminentia* and *scabra.* The female differs from both in having the apical fringe of the second abdominal tergite black, and in having the third tergite clothed entirely with black pubescence; the pubescence of the head, thorax, and abdomen above is whitish in *eminentia* and *scabra* while in *furina* the same areas are, with the exception noted above, clothed with yellow pubescence. The male is very much like *eminentia* but the body is ferruginous, the head and thorax darker than the abdomen. The genitalia are like those of *eminentia.*

Group FOXI

The females of this group have the thorax broader than long, antennal scrobes carinate above, scutellar scale absent, and pygidium longitudinally rugose. The males have the ventral surface of the posterior tibiae greatly flattened, and the posterior tibiae arcuate.

18. DASYMUTILLA FOXI (Cockerell)

Sphaerophthalma foxi Cockerell, Ent. News, vol. 5, p. 199, 1894, male.

Sphaerophthalma heterochroa Cockerell and Casad, Ent. News, vol. 5, p. 298, 1894, female.

Multilla foxii Dalle Torre, Cat. Hymen., vol. 8, p. 41, 1897 male.—Fox, Trans. Amer. Ent. Soc., vol. 25, p. 289, 1899, male.—Melander, Trans. Amer. Ent. Soc., vol. 29, p. 302, 1903, female, male.

Mutilla heterochroa Dalle Torre, Cat. Hymen., vol. 8, p. 46, 1897, female.—Fox, Trans. Amer. Ent. Soc., vol. 25, p. 246, 1899, female.

Ephuta foxi COCKERELL, Proc. Dav. Acad. Nat. Sci., vol. 7, p. 140, 1898, female, male.—ANDRÉ, Gen. Ins., vol. 1, fasc. 11, p. 60, 1903, male.
Sphaerophthalma foxi var. *arizonica* COCKERELL, Entomologist, vol. 33, p. 65, 1900, female.
Ephuta (*Ephuta*) *foxi* var. *arizonica* ANDRÉ, Gen. Ins., vol. 1, fasc. 11, p. 60, 1903, female.
Ephuta (*Ephuta*) *heterochroa* ANDRÉ, Gen. Ins., vol. 1, fasc. 11, p. 60, 1903, female.

Type.—Male, Juarez, State of Chihuahua, Mexico, August 26, 1893 (Cockerell), in collection of American Entomological Society of Philadelphia. The types of *heterachroa* and *foxi* var. *arizonica* are in the U. S. National Museum.

Distribution.—New Mexico, Arizona, Mexico.

SPECIMENS EXAMINED

ARIZONA: Female, Light, July 9, 1919 (Witmer Stone); female, Salt River, Phoenix, August, 1915 (Gordon Grant).

NEW MEXICO: 5 males, Mesilla Park, May 31 (Cockerell); female, Mesilla Park, July 16 (Cockerell); 2 females, Mesilla Park, July 17 (Cockerell); male, Mesilla Park, July 18 (Cockerell); female, Mesilla Park, July 25 (Cockerell); female, Mesilla Park, July 30 (Cockerell); female, male, Mesilla Park, July 31 (Cockerell); female, Mesilla Park, July (Cockerell); 2 females, Mesilla Park, August 18 (Cockerell); 4 females, 2 males, Mesilla Park, August 22, 1896 (Cockerell); female, Mesilla Park, August 24, 1896 (Cockerell); 3 females, 5 males, Mesilla Park, August 26 (Cockerell); 5 females, Mesilla Park, August (Cockerell); female, Mesilla Park, September 24 (Cockerell); female, 8 males, Mesilla Park, September (Cockerell); female, Las Cruces, October, 1894 (Townsend); 4 females, Las Cruces (Cockerell); female, Las Cruces (Wooton); female, Dripping Springs, Organ Mountains, August (Cockerell); male.

The females vary in size from 5 to 11 mm. This species is closely related to *phoenix* (Fox), see discussion under that species. A note on two of the specimens collected by Cockerell states that this species is parasitic in the nests of *Diadasia* species. The genitalia of the male is exactly similar to that of *phoenix* and is therefore not figured. *Dasymutilla foxi* var. *arizonica* Cockerell is a specimen of this species in which the pubescence of the head and thorax is whitish.

19. DASYMUTILLA PHOENIX (Fox)

Plate 1, fig. 4

Mutilla phoenix Fox, Trans. Amer. Ent. Soc., vol. 25, p. 247, 1899, female.
Ephuta (*Ephuta*) *phoenix* ANDRÉ, Gen. Ins., vol. 1, fasc. 11, p. 63, 1903, female.

Type.—Female, Phoenix, Arizona (H. G. Griffith), in collection of American Entomological Society of Philadelphia.

The description of the male is as follows:

Male.—Head and thorax black, abdomen red; length, 11 mm. Head black, clothed with recumbent griseous pubescence and sparse. erect dark hairs; mandibles tridentate at the apex; clypeus bluntly bidentate medially at the apical margin, moderately confluently punctate, clothed with long, dark, erect hairs; scape clothed with mixed pale and dark coarse hairs; first joint of flagellum very slightly shorter than the second, apparently equal in length; antennal scrobes carinate above; front, vertex and genae with large, shallow, more or less confluent punctures; relative widths of head and thorax 7.5–8.5.

Thorax black; pronotum with large, deep, confluent punctures, clothed with recumbent and erect griseous pubescence; mesothorax similarly punctured but clothed with recumbent black pubescence; scutellum with large, deep, more or less confluent punctures, clothed with erect, griseous pubescence; metathorax clothed with erect, pale griseous pubescence; propleura with moderate shallow, confluent punctures, clothed with sparse, griseous pubescence; mesopleura with large, deep, more or less confluent punctures, clothed with sparse griseous pubescence; metapleura glabrous with a few, scattered, large punctures, especially on the ventral half; sides and posterior face of propodeum coarsely reticulate; tegulae glabrous, punctured at the basal and inner lateral margins, clothed with sparse, griseous pubescence.

Abdomen red; first segment subnodose; first tergite with large, deep more or less confluent punctures throughout, clothed with sparse, erect, dark hairs, and a thin apical fringe of fulvous pubescence; second tergite with large, confluent punctures throughout, clothed with long, recumbent, fulvous pubescence; tergites 2–5 with moderate, very close punctures, clothed with long, erect, fulvous pubescence; last tergite very broad, lateral and apical margins reflexed, coarsely rugose; first sternite with a distinct median carina, produced anteriorly into a distinct tooth; second sternite with large, shallow, confluent punctures throughout; sternites 3–6 with close punctures; apical margins of sternites 2–6 with a thin fringe of fulvous pubescence; last sternite depressed at the base, with moderate punctures throughout.

Legs very dark red, clothed with sparse, pale pubescence; posterior tibiae very large, slightly arcuate, the ventral surface very broad, flat, and glabrous, the dorsal surface rounded, scabrous.

Wings dark fuliginous; cell 2nd R_1+R_2 broadly truncate at the apex; cell R_4 almost obsolete; vein M_{3+4} received by cell R_5 about one-third the distance from the base to the apex; veins r–m and R_5 widely separated on vein r.

Allotype.—Male, Tucson, Arizona (F. H. Snow), in collection of University of Kansas.

SPECIMENS EXAMINED

ARIZONA: Female, 33 males, Tucson (F. H. Snow); 2 females, Tucson, June 5, 1919; female, Tucson, June 7, 1924 (A. A. Nichol); female, Tucson, June 28, 1924 (A. A. Nichol); 3 females, Sabino Canyon, Santa Catalina Mountains, May 2, 1919; female, Sierrita Mountains, July 10, 1924 (A. A. Nichol); female, Santa Rita Mountains, June (F. H. Snow); male, San Xavier near Tucson, July 24, 1916; female, Kits Peak, Baboquivaria Mountains, August 1–4, 1916; female, Oracle, June 11, 1903 (Oslar); female, Catal Springs, July 5 (E. A. Schwarz).

This species is very closely related to *foxi* Cockerell. The female does not differ structurally from the female of *foxi* but is larger in size and has the pubescence above whitish instead of scarlet. The genitalia of the male of *foxi* are exactly like those of this species except in size, and the form of the posterior tibiae are the same in the two species. In the male of *phoenix* the pubescence of the mesonotum is almost always black and that of the head and thorax griseous, while in *foxi* the pubescence of these parts is scarlet or fulvous; one male specimen of *phoenix* has the pubescence of the mesonotum griseous, like the pronotum and scutellum.

There is no biological basis for uniting this female and male as the same species, but I have done so for the following reasons: The females of *foxi* and *phoenix* are very closely related, the only differences being in size and color of pubescence; the male of *foxi* and the male described above are also very closely related; the genitalia of the two are the same except in size, and the form of the posterior tibiae is exactly the same in both; the form of the posterior tibiae is very remarkable and is not found in other *Dasymutilla* males. The male and female of *foxi* are already known; since the females of *foxi* and *phoenix* are so nearly related, it seems logical to assume that a male as closely related to *foxi* as the one described above probably is the male of *phoenix*, and I have chosen to regard it in this light rather than to describe it as a new species.

20. DASYMUTILLA DUGESII (Cockerell and Casad)

Sphaerophthalma dugesii COCKERELL and CASAD, Ent. News, vol. 5, p. 294, 1894, female.—CAMERON, Biol. Centr.-Amer., Hymen., vol. 2, p. 365, 1895, female.

Mutilla dugesii DALLE TORRE, Cat. Hymen., vol. 8, p. 33, 1897, female.—FOX, Trans. Amer. Ent. Soc., vol. 25, p. 247, 1899, female.

Ephuta (*Ephuta*) *dugesi* ANDRÉ, Gen. Ins., vol. 1, fasc. 11, p. 59, 1903, female.

Type.—Female, Guanajuato, Mexico (Dr. A. Duges). Location of type specimen not known.

Distribution.—Colorado, Texas, Mexico.

SPECIMENS EXAMINED

COLORADO: Female, Fremont County.
TEXAS: 4 females, 21 males, Juno, July 3, 1917, female.

Dugesii is closely related to both *foxi* and *phoenix.* The female is almost identical with them in form and sculpture but differs very materially in the color and pattern of the pubescence. The male is indistinguishable from the male of *phoenix.* The genitalia are alike and the color of the pubescence is the same, except that in *dugesii* there is a tendency for the pubescence of the pronotum to be tinged with reddish. There is little question that the male placed here is the male of *dugesii* since it shows the same close relationship to the male of *phoenix* and *foxi* as the female of *dugesii* shows to the same two species, and in addition the 21 males and 4 females were collected at Juno, Texas, on the same date. At the present time the male of *dugesii* can only be separated from the male of *phoenix* on the basis of geographical data.

GROUP SPARSA

Females with the thorax pyriform, longer than broad, scutellar scale absent, head as broad as the thorax, pygidium longitudinally striate. Males with the cephalic margin of the pronotum not emarginate, the dorsum and cephalic face of pronotum evenly rounded into one another; posterior third of mesonotum not extended laterally each side into a broad, distinct lobe; second abdominal sternite simple, without a median pit filled with hairs, or a median, longitudinal row of hairs simulating a carina; last abdominal tergite with an apical fringe of erect, black hairs.

21. DASYMUTILLA SPARSA (Fox)

Plate 1, fig. 5

Mutilla sparsa Fox, Trans. Amer. Ent. Soc., vol. 25, p. 240, 1899, female.
Mutilla macra Fox, Trans. Amer. Ent. Soc., vol. 25, p. 245, 1899, male (part).
Ephuta (*Ephuta*) *sparsa* ANDRÉ, Gen. Ins., vol. 1. fasc. 11, p. 64, 1903, female.
Dasymutilla blawa ROHWER, Proc. U. S. Nat. Mus., vol. 41, p. 457, 1912, female.—BANKS, Ann. Ent. Soc. Amer., vol. 14, p. 25, 1921, female.
Dasymutilla segregata var. *finni* ROHWER, Proc. U. S. Nat. Mus., vol. 41, p. 459, 1912, female.
Dasymutilla bruneri ROHWER, Proc. U. S. Nat. Mus., vol. 41, p. 460, 1912, female.
Dasymutilla (*Dasymutilla*) *macra* BRADLEY, Trans. Amer. Ent. Soc., vol. 42, p. 329, 1916, male (not of Cresson).
Dasymutilla macra ROHWER, Bull. 22, Conn. Geol. Nat. Hist. Survey, p. 624, 1916, male (not of Cresson).
Dasymutilla finni BANKS, Ann. Ent. Soc. Amer., vol. 14, p. 25, 1921, female.

Dasymutilla sparsa MICKEL, 19th Rept. State Ent. Minn., p. 104, 1923, female.

Dasymutilla hirticula MICKEL, 19th Rept. State Ent. Minn., p. 107, 1923, male.

Type.—Female, Colorado, in collection of American Entomological Society of Philadelphia. The type of *macra* is also in the collection of the American Entomological Society of Philadelphia; the types of *blawa*, *bruneri*, and *segregata* var. *finni* are in the United States National Museum. The type of *hirticula* is in the collection of the University of Minnesota.

Distribution.—Massachusetts, Connecticut, New York, New Jersey, District of Columbia, Virginia, North Carolina, Tennessee, Indiana, Michigan, Georgia, Florida, Alabama, Illinois, Arkansas, Mississippi, Texas, Arizona, Oklahoma, Colorado, Kansas, Nebraska, Iowa, Minnesota, North Dakota, South Dakota and Alberta, Canada. The male sex occurs throughout this region; typical females, however, are restricted to the last seventeen states, and are replaced by the variety *segregata* in the first nine States. (Figs. 4 and 5).

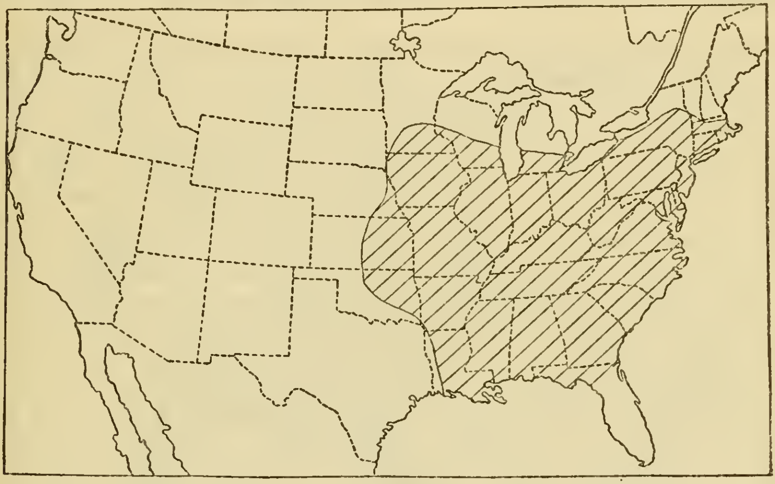

FIG. 4.—DISTRIBUTION OF FEMALES OF DASYMUTILLA SPARSA (FOX)

SPECIMENS EXAMINED

ALABAMA: 2 females, Thomasville, June 11, 1917 (H. H. Knight).

ALBERTA, CANADA: Female, Medicine Hat, August 23, 1919 (Sladen).

ARIZONA: Female, Phoenix, April 20, 1902 (Oslar); female, Fort Apache, August 26, 1897.

ARKANSAS: Female, Marion county, June 29.

COLORADO: Female, Fort Collins, July 28, 1899; female, Fort Collins, August 8, 1899; female, White Rocks, Boulder County, July 3 (Cockerell); 2 females White Rocks, Boulder County, August 13 (Cockerell); female, Denver, June, 1897 (Wickham); female, Ridgway, July (Oslar); 2 females, Kenosha Pass, August (Oslar); female, Berkley (Oslar); male, South Park (Oslar); 3 females.

Connecticut: 4 males, Lyme, August 15, 1915.

District of Columbia: Male, Washington, August 21, 1898.

Florida: Female, Marco, April 18, 1912; male, Fort Myers, May 7, 1916 (J. C. Bradley); female, Orange City, May 4, 1916.

Georgia: 4 females, Spring Creek, May 18–21, 1916 (J. C. Bradley); male Spring Creek, Decatur County, July 16–29, 1912; 2 females, Bainbridge, June 2, 1911 (J. C. Bradley); male, Thomasville August 11, 1915 (C. S. Spooner); female, Cannochee River, Letford, July 29, 1913 (J. C. Bradley); male, Atlanta, July 6, 1909; male, Toccoa, August 15; male, Pinnacle Park, Rabun County, August 20, 1913; 6 males.

Illinois: Male, Algonquin, July 15, 1894; male, Algonquin, July 19, 1895; male, Algonquin, July 20, 1895; female, Meredosia, August 22, 1898 (F. M. McE.); female, Bloomington, August 20, 1909.

Indiana: Male, Posey County. June 18–19, 1914 (H. F. Dietz); female, male, Gary, July 10, 1923 (E. G. Anderson); male, Gary, July 18, 1925 (J. A. Harris, Jr.).

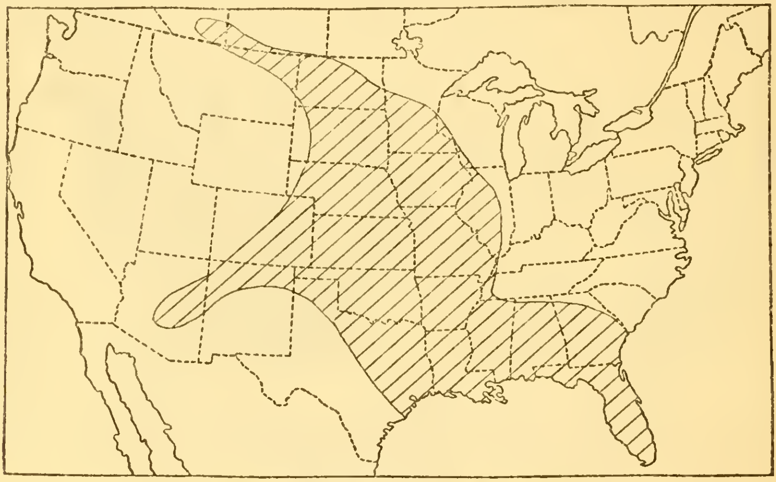

Fig. 5.—Distribution of males of Dasymutilla sparsa (Fox)

Iowa: Female, Iowa City (Wickman); female, Iowa City; female, Ames, June 23, 1897; male, Ames, July 24, 1897; female, Sioux City, July 10, 1920 (C. N. Ainslie); 2 females, Sioux City, July 15, 1920 (C. N. Ainslie); female, Sioux City, July 16, 1921 (C. N. Ainslie); female, Sioux City, June 20, 1921 (C. N. Ainslie); 2 females, Sioux City, July 27, 1923 (C. N. Ainslie); female, Sioux City, July 29, 1923 (C. N. Ainslie); female, Sioux City, July 30, 1923 (C. N. Ainslie); female, Sioux City, August 20, 1918 (C. N. Ainslie); 6 females, Sioux City, August 27, 1920 (C. N. Ainslie); 12 females, Sioux City, September 7, 1920 (C. N. Ainslie); 6 females, Sioux City, September 17, 1921 (C. N. Ainslie); 8 females, Sioux City, September 21, 1923 (C. N. Ainslie); female, Sioux City; female.

KANSAS: Female, Wellsville, July 23; female, Olathe, July 14, 1920 (S. H. Emerson); female, Riley County, June 13 (Popenoe); female, Riley County, June (Popenoe); female, Riley County, June (Marlatt); 2 females, Riley County, July 5 (Popenoe); female, Riley County, July 11 (Popenoe); female, Riley County, July 21 (G. A. Dean); female, Riley County, July 21 (Popenoe); female, Riley County, August 12 (G. A. Dean); female, Riley County, September 20 (F. Marlatt); female, Russell County, July 26, 1912 (F. X. Williams); female, Ellis County, July 19, 1912 (F. X. Williams); female, Rooks County, July 1, 1885; female, Phillips County, August 30, 1912 (F. X. Williams); female, Norton County, August 24, 1912 (F. X. Williams); female, Sheridan County (F. X. Williams); female, Hamilton County; female, Rawlins County (F. X. Williams); 2 females, Sherman County (F. X. Williams); female, Cheyenne County (F. X Williams); 9 females (T. B. A.).

MASSACHUSETTS: Male, Woods Hole; male, Woods Hole, August, 1922 (E. G. Anderson); 2 males, Tisbury, July, 1921 (J. A. Cushman); female, male, Blue Hills; male.

MICHIGAN: 12 males, Ann Arbor, July 16, 1923 (E. G. Anderson); male, Ann Arbor, August 10, 1924 (E. G. Anderson); 2 males, Dexter, July 3, 1923 (E. G. Anderson); 3 males, Dexter, July 18, 1923 (E. G. Anderson); male Dexter, July 19, 1923 (E. G. Anderson); male, Dexter, July 23, 1925 (J. A. Harris, Jr.); 3 males, Dexter, July 27, 1924 (E. G. Anderson); male, Jackson, July 25, 1925 (G. E. Matson).

MINNESOTA: Male, Houston County, August 25, 1921 (J. D. Winter); female, Olmstead County (C. N. Ainslie); 2 females, St. Peter, August 10, 1923 (Sam Kepperley); female, St. Peter, August 11, 1923 (Sam Kepperley); female, Jordan, August 1, 1922 (W. E. Hoffmann); female, Jordan, August 1, 1922 (A. T. Hertig); female, Jordan; male, Fort Snelling, July 27, 1922 (C. E. Mickel); male, Anoka County; male, Anoka County, Fridley sand dunes, July 5, 1923 (C. E. Mickel); male, Anoka County, Fridley sand dunes, July 12, 1923 (C. E. Mickel); male, Anoka County, Fridley sand dunes, July 24, 1923 (C. E. Mickel); 3 males, Anoka County, Fridley sand dunes, July 26, 1923 (C. E. Mickel); 3 males, Anoka County, Fridley sand dunes, July 26, 1923 (R. W. Dawson); 2 males, Anoka County, Fridley sand dunes, July 28, 1922 (Paul Gilmer); 2 males, Anoka county, Fridley sand dunes, July 28, 1922 (C. E. Mickel); 4 males, Anoka County, Fridley sand dunes, August 3, 1924 (R. W. Dawson); male, Anoka County, Fridley sand dunes; August 8, 1924 (R. W. Dawson).

MISSISSIPPI: Female, Natchez, May 27, 1909 (E. S. Tucker).

NEBRASKA: Female, Omaha, July 2, 1913 (L. T. Williams); female, Omaha, July 11, 1914 (L. T. Williams); female, Omaha, July 19, 1914 (L. T. Williams; female, Omaha, August 7, 1914 (L. T. Williams); female, Omaha, August 13, 1914 (L. T. Williams); female, Omaha, August 23, 1913 (L. T. Williams); female, Omaha, August 28, 1913 (L. T. Williams); female, Omaha, September 6, 1913 (L. T. Williams); female, Omaha, September 9, 1913 (L. T. Williams); female, Louisville, July 5, 1915 (E. G. Anderson); female, Lincoln, July 11, 1920 (C. E. Mickel); female, Lincoln, September 8 (R. W. Dawson); female, Maskel, July 16, 1915 (E. G. Anderson); male, Halsey, August 9, 1912 (J. T. Zimmer); 3 females, male, Halsey, August 9, 1925 (R. W. Dawson); 5 males, Halsey, August 10, 1925 (R. W. Dawson); female, male, Halsey, August 11, 1925 (R. W. Dawson); female, 3 males, Halsey, August 12, 1925 (R. W. Dawson); 7 females, Halsey, August 13, 1920 (C. B. Philip); 5 females, Halsey, August 13, 1925 (R. W. Dawson); 2 females, Halsey, August 14, 1920 (C. B. Philip); 2 females, Halsey, August 14, 1925 (R. W. Dawson); 5 females, 5 males, Halsey, August 15, 1925 (R. W. Dawson); 9 females, 3 males, Halsey, August 16, 1925 (R. W. Dawson); 2 males, Halsey, August 19, 1920 (C. B. Philip); 8 females, 8 males, Halsey, August 29, 1924 (R. W. Dawson); 3 females, male, Halsey, August 30, 1924 (R. W. Dawson); 5 females, Halsey, August 31, 1924 (R. W. Dawson); 3 females, Halsey, September 1, 1924 (R. W. Dawson); female, Halsey, September 2, 1924 (R. W. Dawson); 19 females, 4 males, Halsey, September 3, 1924 (R. W. Dawson); female, North Platte, July 23, 1912 (L. M. Gates); female, Scottsbluff, August 5, 1923 (Leonard Worley); female, Mitchell, June 16, 1916 (R. W. Dawson); female, Mitchell, June 17, 1915 (L. M. Gates); female, Mitchell, June 23, 1915 (L. M. Gates); female, Mitchell, June 28. 1916 (C. E. Mickel); female, Mitchell, June 29, 1916 (R. W. Dawson); female, Mitchell, July 16, 1915 (L. M. Gates); female, Mitchell, July 16, 1916 (C. E. Mickel); female, Mitchell, August 4, 1916 (C. E. Mickel); female, Mitchell, August 12, 1915 (E. M. Partridge); female, Mitchell, August 14, 1915 (E. M. Partridge); female, Mitchell, August 24, 1915 (E. M. Partridge); female, Mitchell, August 25, 1915 (E. M. Partridge); female, Mitchell, August 26, 1915 (E. M. Partridge); female, Mitchell, September 7, 1915 (E. M. Partridge); female, Mitchell, September 8, 1915 (E. M. Partridge); 2 females, Glen, August 13, 1906 (H. S. Smith); male, Glen, Sioux County, August 13; female, Glen, August 14, 1906 (L. Bruner); 2 females, Glen, August, 1905; female, Harrison, August 12, 1912 (E. J. Taylor); female, Monroe Canyon, Sioux County, June 25, 1911 (R. W. Dawson); male, Monroe Canyon, Sioux County, August 6, 1908 (C. H. Gable); 4 females, 21 males, Monroe Canyon, Sioux County, August 16, 1912 (R. W. Dawson); 4 females, 9 males, Monroe Canyon, Sioux County, August 16, 1912 (E. J. Taylor); female, Monroe Canyon, Sioux County, August 19, 1912 (E. J. Taylor); female, Monroe Canyon, Sioux County, August 27, 1912 (E. J. Taylor); female, Monroe Canyon, Sioux County, August 27, 1912 (R. W. Dawson); male, Bad Lands, Sioux County (L. Bruner); 3 females, Sioux County; 2 females, Pine Ridge, July.

New Jersey: 11 males, Weymouth, July 25, 1923; 2 males, Weymouth, August 16, 1904; 7 males, Wilson's Landing, July 26, 1923 (J. C. Bradley); 10 males, Reega, July 26, 1923 (J. C. Bradley); 3 males, Mensatico, July 27, 1923 (J. C. Bradley); male, Da Costa, July 16, 1901; male, Hammonton, September 6, 1903; male, Clementon, August 15, 1904; male, Cassville, August, 1910 (W. T. Davis); male, Milltown, September 10, 1910; male, Lakehurst, August 15, 1911 (W. T. Davis); male, Brown's Mills Junction, June 21, 1908; male, Brown's Mills Junction, June 24, 1906; male, Brown's Mills Junction, July 10, 1906; male, Ramsey, July 13, 1912.

New York: Male, Yaphank, August 27, 1916 (W. T. Davis); male, Sea Cliff, L. I., July; male, Cold Springs Harbor, L. I., July 9 ,1921 (E. G. Anderson); male, Cold Springs Harbor, L. I., July 18, 1921 (S. H. Emerson); male, Pelham, August 7, 1898.

North Carolina: Male, Southern Pines, August 1, 1916; male, Southern Pines, August 9, 1911 (A. H. Manee).

North Dakota: Female, Cannon Ball, August 20, 1922 (O. A. Stevens); 3 females, Moffit, August 22, 1922 (O. A. Stevens); 2 females, Bottineau, August 23, 1923 (C. N. Ainslie); female, Brelea, August 21, 1922 (O. A. Stevens); 3 females, Medora, August 3, 1923 (O. A. Stevens); 3 females, Beach, August 25, 1923 (C. N. Ainslie); female.

OKLAHOMA: Female, Payne County, June 3, 1925 (W. J. Brown); female, Payne County, June 20, 1925 (W. J. Brown); female, Payne County, September 8, 1923 (W. J. Brown).

SOUTH DAKOTA: Female, Buffalo, July 31, 1924; female, Martin, September 12, 1925 (H. C. Severin).

TENNESSEE: Male, Grassy Cove, Cumberland County, July 7, 1922 (T. H. Hubbell).

TEXAS: Female, Cuero, June 19; female, Richmond, May 29, 1918 (J. C. Bradley); 2 females, Richmond, Brazos river, June 22, 1917; female, Calvert, August 23, 1907 (R. A. Cushman); female, Childress, July 8, 1906 (J. D. Mitchell); female, Lee County, March 20, 1907; female, Lee County, May 28, 1906; female, male, Fedor.

VIRGINIA: Male, Great Falls, July 13; 3 males, Kearney, August 15, 1913 (Wm. Middleton); male, Falls Church, August 4, 1913 (S. A. Rohwer); male, Falls Church, August 4, 1913 (H. B. Kirk); Falls Church, August 20, 1913 (C. T. Greene); male, Falls Church, September 4, 1915 (C. T. Greene); male, Falls Church, September 14, 1915 (G. M. Greene); male, Wiehle, August 28, 1913 (W. Middleton).

This species is a close relative of *texanella* Mickel. The female is easily distinguished from the latter by the color and pattern of the pubescence. It may be recognized at once by the absence of a scutellar scale and the presence of a median spot of silvery pubescence at the apex of the second abdominal tergite. I have examined the types of *blawa*, *bruneri*, and *segregata* var. *finni*, and find them to be identical with this species. The male of *sparsa* is *hirticula* Mickel. The male and female listed above from Blue Hills, Mass., were taken in copula. The female is a specimen of the following variety *segregata*, while the male is a typical specimen of *hirticula*. The geographical distribution of *sparsa* and its variety *segregata* extends from the Atlantic coast west to North Dakota, Colorado, Oklahoma, and Texas, while *hirticula* occurs throughout the same area. *Hirticula* is the only male *Dasymutilla* whose geographical distribution coincides with that of *sparsa* and its variety *segregata*. There are no differences in the male specimens from the eastern states and those from the western states by which they can be separated. Most of the female specimens from the eastern and southern states belong to the variety *segregata*, but the female specimens listed here from Georgia and Florida are typical *sparsa* with a median spot of silvery pubescence on the apical margin of the second abdominal tergite. *Segregata* var. *finni* described by Rohwer from Georgia was based on such a specimen.

22. DASYMUTILLA SPARSA var. SEGREGATA Rohwer

Dasymutilla segregata ROHWER, Proc. U. S. Nat. Mus., vol. 41, p. 459, 1912, female.—BANKS, Ann. Ent. Soc. Amer., vol. 14, p. 25, 1921, female.

Dasymutilla champlaini ROHWER, Proc. U. S. Nat. Mus., vol. 41, p. 461, 1912, female; Bull. 22, Conn. Geol. Nat. Hist. Surv., p. 624, 1916, female.—BANKS, Ann. Ent. Soc. Amer., vol. 14, p. 25, 1921, female.—MICKEL, 19th Rept. State Ent. Minn., p. 104, 1923, female.

Dasymutilla (*Dasymutilla*) *vesta* Cresson, race *zella* Bradley, Trans. Amer. Ent. Soc., vol. 42, p. 328, 1916, female (part).

Type.—Female, Pennsylvania, in collection of U. S. National Museum. The type of *champlaini* is in the U. S. National Museum.

Distribution.—Massachusetts, Connecticut, New York, Pennsylvania, New Jersey, Maryland, Virginia, North Carolina, Georgia, Alabama, Louisiana, Tennessee, Indiana, Michigan, Illinois, Iowa, Minnesota, Nebraska, Kansas, and Oklahoma. (Fig. 6).

SPECIMENS EXAMINED

Alabama: Female, Kushia, October 18–31, 1916.

Connecticut: 2 females, Lyme, August 13, 1915; female, Lyme, August 25, 1915.

Georgia: Female, Atlanta; female, Mountain City, August 19, 1913; female, Stone Mountain, August 3, 1913; female, Toccoa, August 4–5, 1913; 2 females.

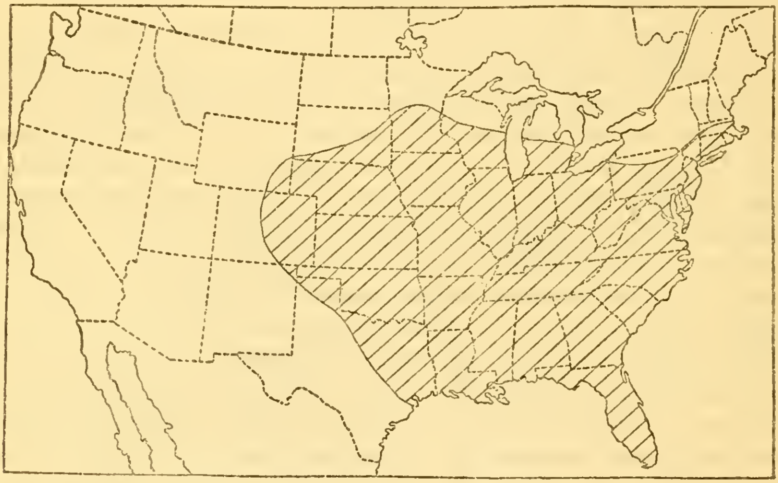

Fig. 6.—Distribution of Dasymutilla sparsa var. segregata Rohwer

Illinois: Female, Peoria, July 25; 3 females, Havana; female, Algonquin, July 10, 1895; 3 females, Algonquin, July 19, 1895; female, Algonquin, July 26, 1895.

Indiana: Female, Marion county, July, 1915 (H. F. Dietz); female, Posey County, June 18–19, 1914 (H. F. Dietz); female, Elkhart City, July 10, 1899.

Iowa: Female, Sioux City, September 13, 1919 (C. N. Ainslie).

Kansas: Female, Medora (Horton); 2 females, Riley County, August 12 (G. A. Dean).

Louisiana: 2 females, Jennings, October–December, 1906 (A. J. Hammar).

Maryland: Female, Chestertown, August 19, 1899 (E. G. Vanatta); female, Chesapeake Beach, June 28, 1911 (Wm. T. Davis).

Massachusetts: Female, Woods Hole, July 17, 1922 (E. G. Anderson); female, Woods Hole, July 29, 1919; female, Sconset, August 4, 1902 (J. L. Zabriskie); female, North Saugus, September 5, 1900 (C. C. Gowdey).

MICHIGAN: Female, Ann Arbor, June, 1924 (E. G. Anderson); 17 females, Ann Arbor, July 16, 1923 (E. G. Anderson); 2 females, July 25, 1917 (E. G. Anderson); female, Ann Arbor; 2 females, Dexter, July 3, 1923 (E. G. Anderson); 2 females, Dexter, July 18, 1923 (E. G. Anderson); 16 females, Dexter, July 27, 1924 (E. G. Anderson); 4 females, Dexter, August 31, 1924 (E. G. Anderson); 11 females, Dexter, September 14, 1924 (E. G. Anderson); 19 females, Dexter, September 16, 1924 (E. G. Anderson); 18 females, Dexter, September 18, 1924 (E. G. Anderson); 31 females, Dexter, September 19, 1924 (E. G. Anderson); 5 females, Dexter, September 23, 1924 (E. G. Anderson); female, Jackson, July 24, 1925 (G. E. Matson); female, Jackson, July 29, 1925 (G. E. Matson); 2 females, Jackson, July 29, 1925 (W. M. McComb).

MINNESOTA: Female, Gray Cloud Island, August 5, 1896; female, Gray Cloud Island, August 20, 1898; female, Barden sand dunes, Scott County, July 29, 1923 (R. W. Dawson); 2 females, Barden sand dunes, Scott County, July 29, 1923 (C. E. Mickel); female, Barden sand dunes, Scott County, August 25, 1922 (C. E. Mickel); 2 females, Fridley sand dunes, Anoka County, May 28, 1925 (C. B. Philip); female, Fridley sand dunes, Anoka County, July 14, 1922 (A. A. Nichol); 2 females, Fridley sand dunes, Anoka County, July 14, 1923 (C. E. Mickel); 2 females, Fridley sand dunes, Anoka County, July 17, 1923 (C. E. Mickel); 27 females, Fridley sand dunes, Anoka County, July 24, 1923 (C. E. Mickel); 9 females, Fridley sand dunes, Anoka County, July 26, 1923 (R. W. Dawson); 11 females, Fridley sand dunes, Anoka County, July 28, 1922 (C. E. Mickel); 4 females, Fridley sand dunes, Anoka County, July 28, 1922 (Paul Gilmer); 3 females, Fridley sand dunes, Anoka County, July 31, 1922 (C. E. Mickel); 9 females, Fridley sand dunes, Anoka County, August 8, 1922 (A. T. Hertig); 12 females, Fridley sand dunes, Anoka County, August 8, 1922 (C. W. Johnson).

NEBRASKA: Female, Lincoln, (Shimek); female, Maskell, July 16, 1915 (E. G. Anderson); female, West Point.

NEW JERSEY: 3 females, May's Landing, June 19, 1925 (F. C. Fletcher); 6 females, Weymouth, July 25, 1923; female, Wilson's Landing, July 26, 1923; female, Mensatico, May 14, 1922 (J. C. Bradley); female, Manumuskin, June 23, 1902; female, Manumuskin, September 15, 1902 (E. Daecke); female, Da Costa, May 17, 1903; 2 females, Da Costa, July 19; female, Da Costa, July 25, 1923; female, Da Costa, July 28, 1902 (E. Daecke); 2 females, Da Costa, August 3, 1902 (E. Daecke), 3 females, Iona, June 16, 1902; female, Lucaston, July 2, 1902; 2 females, Clementon, May 24, 1902 (J. C. Bradley); female, Clementon, May 30, 1897; female, Clementon, May 30, 1901; female, Clementon, June 6, 1901; female, Clementon, August 13, 1899; female, Bennett, July 16, 1917; female, Camden County; female, Jamesburg, September 20, 1909 (W. T. Davis); female, Old Bridge, April 23, 1910 (W. T. Davis); female, Brown's Mill Junction, June 25, 1905; female, Lakehurst, July 2, 1912; female, Lakehurst, August, 1905; female, Fort Lee District; female, Ramsey, July 6, 1912; female, Midwood, August 18, 1910.

NEW YORK: Female, Yaphank, L. I., July 8; Female, Yaphank, L. I., August 29, 1916 (W. T. Davis); female, Amagansett, L. I., August 10, 1912; female, Selden, L. I., August 30, 1916 (W. T. Davis); female, Cold Springs Harbor, L. I., July 8, 1921 (E. G. Anderson); female, Cold Springs Harbor, L. I., July 9, 1921 (E. G. Anderson); 2 females, Cold Springs Harbor, L. I., July 12, 1921 (E. G. Anderson); female, Cold Springs Harbor, July 16, 1921 (S. H. Emerson); female, Cold Springs Harbor, L. I., August 4, 1921 (E. G. Anderson); female, Cold Springs Harbor, August 10, 1900; 2 females, Orient, August 19, 1909; female, Huguenot, August 6, 1904; female, New Russia, Essex County, August 18, 1912 (J. C. Bradley).

North Carolina: Female, Southern Pines, June 24, 1909; female, Raleigh early October (F. Sherman).

Oklahoma: Female, Wister, July 3 (H. S. Barber).

Pennsylvania: Female, Rockville, July 19, 1914; female, Euterline, July 17, 1912 (E. Daecke.)

Tennessee: Female, Townshend, July 10, 1910; female, Allardt, Fantress County, August 18, 1922 (T. Hubbell).

Virginia: Female, Falls Church, June 17, 1913 (W. Middleton); female, Falls Church, August 4, 1913 (G. M. Greene); female, Falls Church, August 4, 1913 (H. B. Kirk); female, Falls Church, September 1, 1914 (C. T. Greene); female, Falls Church, September 4, 1915 (C. T. Greene); female, Falls Church, September 9, 1912 (C. T. Greene); female, Loudoun County, August (F. C. Pratt); female, Wingina, August 2, 1916 (W. T. Davis); female, Lynchburg, July 29, 1916 (W. T. Davis).

Segregata, which has been known under the name *champlaini*, is only a variety of *sparsa* Fox. Typical *segregata* does not have the median spot of silvery pubescence at the apex of the second abdominal tergite. The apical fringe of the latter is largely black, the lateral extremes only, silvery. In form and puncturation, the variety *segregata* is almost an exact duplicate of *sparsa*. I have examined the type of *champlaini* Rohwer and find it to be the same as this variety.

23. DASYMUTILLA TEXANELLA, new name

Mutilla texana Blake, Trans. Amer. Ent. Soc., vol. 7, p. 250, 1879, female.—Dalle Torre, Cat. Hymen., vol. 8, p. 91, 1897, female.—Fox, Trans. Amer. Ent. Soc., vol. 25, p. 241, 1899, female.—Melander, Trans. Amer. Ent. Soc., vol. 19, p. 299, 1903, female.

Sphaerophthalma texana Blake, Trans. Amer. Ent. Soc., vol. 13, p. 212, 1886, female.

Ephuta (*Ephuta*) *texana* André, Gen. Ins., vol. 1, fasc. 11, p. 64, 1903, female.

Type.—Female, Texas, in collection of American Entomological Society of Philadelphia.

Distribution.—Texas, Kansas, and Colorado.

SPECIMENS EXAMINED

Colorado: Female, Bent County, August 29.

Kansas: Female, Morton County, August 5, 1911 (F. X. Williams); female, Hamilton County, August 27; female, Greeley County (F. X. Williams); female, Wichita County (F. X. Williams); female, Scott County (F. X. Williams); 2 females, Logan County (F. X. Williams).

Texas: Female, Austin, October; 2 females, Eastland County, May 27, 1921 (Grace O. Wiley); female, Eastland County, June 11, 1921 (Grace O. Wiley); female, Eastland County, August 19, 1920 (Grace O. Wiley); female, Stevens County, October 22, 1920 (Grace O. Wiley); female, Phantom Lake, Fort Davis Quad, June 6, 1916 (F. M. Gaige); 3 females, Juno, July 3, 1917 (R. C. Shannon).

The type of this species has been examined and found to agree with the specimens placed here. This species varies considerably in the color of the head and thorax, and in the color of the pubescence on the second, third, and fourth abdominal tergites. Some specimens from Texas and most specimens from Kansas have the head and thorax ferruginous rather than dark or almost black. The apical fringes of the first and second abdominal tergites are entirely pale, or silvery, in all the specimens at hand. Specimens from Texas have the pubescence on abdominal tergites 3 and 4 mostly black, but specimens from Kansas have the black pubescence reduced to a small spot on the median area of tergite three; and one specimen even has the pubescence of the apical tergites entirely pale. The form of the ventral carina is like that figured by Melander (1903), and all the specimens agree in form and sculpture. The specimens vary in length from 8 to 12 mm. Blake's species requires a new name since *texana* is preoccupied by Cresson (1875), see page 148.

24. DASYMUTILLA MACRA (Cresson)

Plate 1, fig. 7

Mutilla macra CRESSON, Proc. Ent. Soc. Phila., vol. 4, p. 429, 1865, male.—BLAKE, Trans. Amer. Ent. Soc., vol. 7, p. 244, 1879, male.—DALLE TORRE, Cat. Hymen., vol. 8, p. 56, 1897, male.—FOX, Trans. Amer. Ent. Soc., vol. 25, p. 244, 1899, male (part).—MELANDER, Trans. Amer. Ent. Soc., vol. 29, p. 302, 1903, male (part).

Mutilla (*Sphaerophthalma*) *macra* BLAKE, Trans. Amer. Ent. Soc., vol. 3, p. 238, 1871, male.

Sphaerophthalma hispida BLAKE, Trans. Amer. Ent. Soc., vol. 13, p. 226, 1886, male.

Sphaerophthalma macra BLAKE, Trans. Amer. Ent. Soc., vol. 13, p. 230, 1886, male.

Mutilla hispida DALLE TORRE, Cat. Hymen., vol. 8, p. 47, 1897, male.

Ephuta (*Ephuta*) *macra* ANDRÉ, Gen. Ins., vol. 1, fasc. 11, p. 61, 1903, male.

Type.—Male, Colorado Territory, in collection of American Entomological Society of Philadelphia. The type of *hispida* is in the collection of the American Entomological Society of Philadelphia.

Plesiotype.—Male, White Rocks, Boulder County, Colorado, August 13 (Cockerell), in collection of University of Minnesota.

Distribution.—Missouri, Arkansas, Texas, New Mexico, Colorado, Kansas, Nebraska, Iowa, South Dakota, North Dakota, Wyoming, and Alberta, Canada. (Fig. 7.)

SPECIMENS EXAMINED

ALBERTA, CANADA: Male, Medicine Hat, August 20, 1916 (Sladen).

ARKANSAS: Male, Pine Bluffs.

COLORADO: Male, Fort Collins, August, 1899; male, Denver, July 12, 1902; male, Denver, August, 1912; male, Denver, September 1, 1906 (Oslar); 2 males, Platte Cañon, July 1; male, Platte Cañon, July (Oslar); 4 males, Turkey Creek Cañon, June (Oslar); 4 males, Turkey Creek Cañon, July (Oslar); male, Clear Creek (Oslar); 3 males, Silverton, August (Oslar).

IOWA: 2 males, Sioux City, July 8, 1921 (C. N. Ainslie); male, Sioux City, July 16, 1921 (C. N. Ainslie); male, Sioux City, August 10, 1917 (C. N. Ainslie).

KANSAS: Male, Wellsville, July 23, 1901; 2 males, Riley County, August 7, (F. Marlatt); male, Riley County, August 18 (G. A. Dean); male, Mead County, July 10, 1911 (F. X. Williams); male, Seward County, August 18, 1911 (F. X. Williams); male, Finney County, June, 1895 (H. W. Menke); male, Sherman County (F. X. Williams); male, Decatur County (F. X. Williams); 3 males, Rawlins County (F. X. Williams); male, Cheyenne County (F. X. Williams); male, (T. B. A.).

MISSOURI: Male, Hollister, August 12, 1912 (H. H. Knight); male, August.

NEBRASKA: 2 males, Omaha, July 14, 1914 (L. T. Williams); male, Louisville, July 29, 1914 (H. A. Jones); 2 males, Lincoln, July; male, Haigler, August 19, 1909 (C. H. Gable); male, Mitchell, August 4, 1916 (C. E. Mickel); male, Mitchell, August 5, 1914 (L. M. Gates); male, Mitchell, August 16, 1915 (E. M. Partridge); male, Mitchell, September 16, 1915 (E. M. Partridge); male, Glen, July 12, 1910 (L. Bruner); male, Glen, August 9, 1905; male, Monroe Canyon, Sioux County, August 16, 1912 (R. W. Dawson); male, Bad Lands, Sioux County, August 10, 1908 (L. Bruner); male, Pine Ridge, July.

NEW MEXICO: Male, Chaves; male, Cont. D. Terr?, August 2.

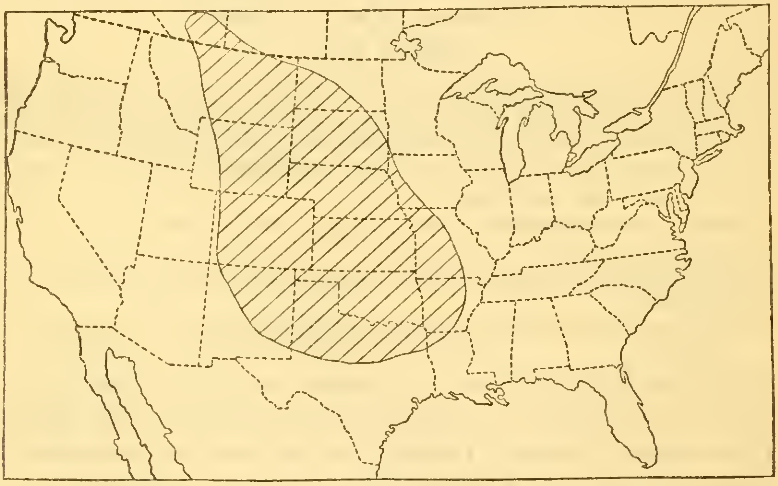

FIG. 7.—DISTRIBUTION OF DASYMUTILLA MACRA (CRESSON)

NORTH DAKOTA: Male, northeast North Dakota (C. N. Ainslie); male, Cannon Ball, August 20, 1922 (O. A. Stevens); male, Medora, August 3, 1923 (O. A. Stevens).

SOUTH DAKOTA: Male, Capa, August 18, 1921 (H. C. Severin).

TEXAS: Male, Dallas, October 3, 1905 (F. C. Bishopp); male, Farmersville, July 13, 1905 (F. C. Bishopp).

WYOMING: 2 males, 30 miles north of Lusk, July, 1895.

This species has been confused with *sparsa* Fox until recent years. It may be distinguished from the latter by the fact that in *sparsa* the second abdominal sternite is ferruginous, while in *macra* the second abdominal sternite varies in color from dark mahogany red to black. The validity of this criterion for the identification of the two species is confirmed by an examination of the genitalia of a large series of specimens. The type of *macra* has been examined and the genitalia found to be the same as figured for this species. The pubescence of the second tergite of *macra* is longer, somewhat coarser, and of more uniform color than in *sparsa*. Specimens vary in length from 8 to 11 mm. This species does not occur east of the Mississippi river, as far as is known, while *sparsa* is well distributed over the eastern United States as well as the central western states.

25. DASYMUTILLA STEVENSI, new species

Female.—Black, the front, vertex, thorax above, and abdomen above clothed with ochraceous pubescence; head as wide as the thorax; thorax pyriform; scutellar scale absent; pygidium longitudinally striate. Length, 12 mm.

Head black; mandibles acute at the apex, with a minute tooth within at a point one-third of their length from the apex; clypeus not bidentate medially on the apical margin, the latter straight; first joint of flagellum slightly shorter than twice its own width at the apex; antennal scrobes carinate above; front with large, deep, confluent punctures throughout, sparsely clothed with long, erect, ochraceous pubescence; vertex with the punctures smaller and separated, sparsely clothed with long, erect, ochraceous pubescence; genae glabrous, with moderate, sparse punctures, not nearly as coarsely sculptured as the front, sparsely clothed with erect, black pubescence; relative widths of head and thorax, 7.5–7.5.

Thorax black, the dorsum very coarsely, deeply and confluently punctured, becoming reticulate posteriorly, especially on the dorsal surface of the propodeum, clothed with long, erect, or suberect, orchraceous pubescence; propleura irregularly punctate, the punctures small; very sparsely clothed with long, erect, black pubescence; anterior half of mesopleura glabrous with a few scattered punctures, the posterior half, coarsely and confluently punctate, the whole very sparsely clothed with long, erect, black pubescence; metapleura glabrous, the dorsal half impunctate, the ventral half with scattered, shallow punctures; anterior half of sides of propodeum with scattered small punctures, the posterior half with very large, shallow reticulations; ventral half of posterior face of propodeum glabrous, finely punctate, the dorsal half with very large, coarse reticulations; posterior face of propodeum rounded into the dorsum of the propodeum; propodeum very sparsely clothed with long, erect, black pubescence, except the dorsum which is clothed with long, ochraceous pubescence; scutellar scale entirely absent.

Abdomen black, second tergite, except the basal and lateral margins, tergites 3–5, and basal margin of last tergite clothed with erect and suberect, long, ochraceous pubescence; disk of first tergite glabrous, the lateral and apical margins scabrose, due to the very large, coarse, deep punctures; sparsely clothed with long, erect, black pubescence; second tergite with large, elongate, more or less confluent punctures at the base and sides, the disk with large, mostly separated punctures; tergites 3–5 with small, more or less confluent punctures; pygidial area longitudinally striate; first sternite with a definite longitudinal keel, its posterior half emarginated; second sternite glabrous, with large, deep, elongated punctures, sparse on the disk, and rather close at the sides; sternites 3–5 with small, very close, confluent punctures; the sternites very sparsely clothed with long, erect, black pubescence, and sternites 2–5 with a thin apical fringe of black pubescence.

Legs black, clothed with long, black pubescence; calcaria black.

Holotype.—Female, Medora, North Dakota, August 3, 1923 (O. A. Stevens), in collection of University of Minnesota.

Paratypes.—8 females, Medora, North Dakota, August 3, 1923 (O. A. Stevens); female, Hot Springs, South Dakota, August 27, 1922 (H. C. Severin); female, Buffalo, South Dakota, July 31, 1924; female, Sioux City, Iowa, July 21, 1921 (C. N. Ainslie); female, Halsey, Nebraska, September 1, 1924 (R. W. Dawson); female, Halsey, Nebraska, September 4, 1924 (R. W. Dawson); female, Scottsbluff, Nebraska, August 5, 1923 (Leonard Worley); female, Monroe Canyon, Sioux County, Nebraska, August 16, 1912 (E. J. Taylor); female, Monroe Canyon, Sioux City, Nebraska, August 19, 1912 (R. W. Dawson); female, Monroe Canyon, Sioux County, Nebraska, August 20, 1908 (J. T. Zimmer); female, Riley County, Kansas, July 19 (G. A. Dean); female, Riley County, Kansas, September 1 (Popenoe); female, Riley County, Kansas, September 6 (Popenoe); 3 females, Greeley County, Kansas (F. X. Williams); female, Morton County, Kansas, August 5, 1911 (F. X. Williams); female, Colorado (Popenoe); female, Balmorhea, Texas, October 5, 1924 (Sanborn and Scholls); female, Phantom Lake, Fort Davis Quad, Texas, June 1, 1916 (F. M. Gaige); 2 females, San Augustine, New Mexico, August 29; female, San Augustine, New Mexico (Cockerell); female, Mesilla, New Mexico, August 23 (Townsend); female, Mesilla, New Mexico, August 21 (Cockerell); female, Winslow, Arizona, July 31 (Barber and Schwarz); 2 females, Florence, Arizona (C. R. Biederman); female, Emery County, Utah, August 14, 1921 (Grace O. Wiley). Paratypes are in the following collections: United States National Museum, American Entomological Society of Philadelphia, University of Kansas, University of Michigan, University of Nebraska, Kansas Agricultural College, South Dakota Agricultural College, New Mexico Agricultural College, University of Minnesota, O. A. Stevens, C. N. Ainslie, and the author.

I take pleasure in naming this species for my friend Prof. O. A. Stevens, who collected the series of specimens from Medora, North Dakota.

This species is very closely related to *nupera* Mickel. The principal difference between the two is the color of the pubescence of the head and thorax. The sculpturing and form of the body is practically the same in both. The entire absence of a scutellar scale, and the pyriform thorax with the posterior face of the propodeum broadly rounded into the dorsum of the propodeum are characteristic features which distinguish this species, as well as *nupera* from any of those superficially resembling it. The paratypes vary in size from 9.5 mm. to 12.5 mm.; there is practically no variation in the color of their pubescence.

26. DASYMUTILLA MEDORA, new species

Plate 1, fig. 6

Male.—Black; vertex, pronotum, mesonotum, scutellum, apical third of second tergite and tergites 3–6 clothed with long, erect, yellow pubescence; tegulae finely, setigerously punctate throughout, the hairs yellowish; second sternite simple without a median pit or other modification; length, 10 mm.

Head black; vertex clothed with sparse, long, erect, yellow pubescence, the remainder of the head clothed with sparse, long, erect, black pubescence; mandibles acute at the tips, feebly bidentate within about one-third the length of the mandibles from the apex; anterior margin of clypeus slightly bidentate medially; clypeus densely punctate; scape with a strong carina, and an indication of a second carina beneath, closely, indistinctly punctate, clothed with coarse, erect, black hairs; first segment of flagellum distinctly shorter than the second (measured dorsally); antennal scrobes not at all carinate above; front with moderate, close, shallow punctures; vertex and genae with the punctures the same size but separated; relative widths of head and thorax, 5.75–7.

Thorax black; pronotum, mesonotum, scutellum and metanotum with long, erect, yellow pubescence, remainder of thorax with long, erect, black pubescence; cephalic face of pronotum sparsely punctate, evenly rounded into the dorsum, not emarginate medially; dorsum of pronotum, mesonotum, and scutellum densely, more or less confluently punctate; tegulae finely, setigerously punctate throughout, the hair yellowish; propleura scatteringly punctate, the punctures more or less indistinct; mesopleura with large, scattered punctures anteriorly, large, contiguous, somewhat confluent punctures posteriorly; metapleura glabrous, impunctate, except for scattered, large punctures ventrally; sides of propodeum coarsely, foveately reticulate; posterior face and dorsum of propodeum deeply, foveately reticulate.

Abdomen black; apical third of second tergite, tergites 3–6, base of ultimate tergite and apical fringes of sternites 2–3 laterally with long, erect, yellow pubescence; remainder of abdomen with long, erect, black pubescence; first segment short, broad, nodose; first tergite coarsely, confluently, foveately punctured; second tergite densely punctate, the punctures basally and laterally somewhat confluent; tergites 3–6 with small, close punctures; ultimate tergite punctured at the basal margin; pygidial area mostly glabrous, indistinctly sculptured, with a median, longitudinal ridge; apical margin of pygidium with a fringe of erect, short hairs; first sternite coarsely, confluently punctate, the median carina prominent but not produced or dentiform; second sternite with large, separated punctures throughout, the punctures closer at the lateral margins; sternites 3–6 with small, scattered punctures at the apical margins; ultimate sternite punctate and pubescent.

Legs black, sparsely clothed with long black pubescence; calcaria black.

Wings dark fuliginous; cell 2nd R_1+R_2 broadly truncate at the apex; cell R_4 almost obsolete; vein M_{3+4} received by cell R_5 very near its base; veins r–m and R_5 separated on vein r; vein r–m very long and strongly sinuate.

Holotype.—Male, Medora, North Dakota, August 3, 1923 (O. A. Stevens), in collection of University of Minnesota.

Paratypes.—4 males, Medora, North Dakota, August 3, 1923 (O. A. Stevens); male, Riley County, Kansas, July 17 (Popenoe); male, Hamilton County, Kansas, August 27; male, Phantom Lake, Fort Davis Quad, Texas, July 12, 1916 (F. M. Gaige); 3 males, San Augustine, New Mexico (Cockerell); male, Albuquerque, New Mexico, August, 1894 (Snow); male, Gila River, New Mexico, July 22; male, New Mexico, in collections of University of Minnesota, Kansas Agricultural College, University of Michigan, New Mexico Agricultural College, Cornell University, O. A. Stevens and the author.

This species looks very much like *myrice* but is very different from that species. It may be easily recognized by the punctate tegulae, absence of a carina on the antennal scrobes above, absence of a median pit on the second sternite, presence of an apical fringe on the pygidium, and vein M_{3+4} received by cell R_5 very near the base; in some specimens vein M_{3+4} is almost coalescent with vein r-m. The length of the paratypes varies from 9–12 mm. This is probably the male of *stevensi.*

27. DASYMUTILLA NUPERA, new species

Female.—Head and thorax black, abdomen with orange pubescence; thorax pyriform; scutellar scale absent; pygidium longitudinally striate. Length, 8 mm.

Head black, sparsely clothed with erect and recumbent, long, black hairs; mandibles acute at the apex, no evident tooth within; scape shining, sparsely punctate, sparsely clothed with coarse, black hairs; first segment of flagellum long, twice as long as it is broad at the apex; antennal scrobes not carinate above; front closely, confluently punctured; vertex with smaller, separated punctures; genae shining, with sparse, small punctures; relative widths of head and thorax, 5–5.

Thorax longer than broad, the dorsum rounded off posteriorly into the posterior face of the propodeum; dorsum sparsely clothed with erect and recumbent, long, black hairs, rugoso-punctate (more coarsely sculptured than the head); propleura shining, with a few scattered punctures; anterior half of mesopleura shining, with scattered, microscopic punctures, posterior half with large, confluent punctures; metapleura shining, impunctate, except for a few large, shallow punctures ventrally; sides of propodeum rounded into posterior face, shining, impunctate on the anterior half, with large shallow reticulations on the posterior half; posterior face of propodeum deeply and coarsely reticulate; scutellar scale absent.

Abdomen black; first tergite short, nodose, very roughly and coarsely sculptured on the posterior third; second tergite with large, elongate, confluent punctures, clothed with long, orange hairs, except at the extreme base and sides the hairs are black; tergites 3–5 with long, orange hairs; pygidium longitudinally striate; second sternite with large, elongate, more or less confluent, setigerous punctures; sternites 2–5 with a thin fringe of obscure yellowish hairs.

Legs very dark reddish black, thinly clothed with long black hairs, calcaria black.

Holotype.—Female, Brownsville, Texas, June (2336), in entomological collection of University of Kansas.

Paratypes.—Female, Valentine, Presidio County, Texas (J. Bequaert); female, Del Rio, Texas, June 22–27 (Wickham); female, Mesilla Park, New Mexico, June (Cockerell); female, Mesilla Park, New Mexico, October 1, 1899 (Cockerell); female, Las Cruces, New Mexico (June); in collections of American Museum of Natural History, University of Minnesota, New Mexico Agricultural College, J. Bequaert and the author.

Closely related to *stevensi* and may prove to be only a variety of that species. The paratypes vary from 6 to 11 mm. in length.

28. DASYMUTILLA DIONYSIA, new species

Female.—Head and thorax mahogany red, the abdomen ferruginous; sparsely pubescent throughout; head as wide as the thorax; second abdominal tergite with very large, separated, foveate punctures, each bearing an erect hair; apical margin of second tergite with a median spot of pale pubescence; pygidium longitudinally striate; length, 10 mm.

Head quadrate, mahogany red; mandibles acute at the apex, unidentate within about one-third their length from the apex; anterior margin of clypeus very feebly bidentate medially; anterior half of clypeus glabrous, impunctate, the posterior half densely punctured, with its long pale pubescence forming the clypeal fringe; scape with shallow, somewhat indistinct punctures above; first segment of flagellum slightly longer than twice its width at the apex, about as long as segments three and four united; antennal scrobes not carinate above; front and vertex clothed with sparse, recumbent, silvery pubescence, and scattered, erect, black hairs; front coarsely, more or less confluently punctate; vertex coarsely punctate, but the punctures more shallow and separated than on the front; genae with moderate, shallow, separated punctures, not nearly as coarsely sculptured as the front, clothed with sparse, recumbent, silvery pubescence; distance between margin of the eyes and postero-lateral angles of the head about equal to the greatest diameter of the eyes; relative widths of head and thorax, 7.5–7.5.

Thorax pyriform, mahogany red; dorsum of thorax with very large, coarse, more or less confluent punctures, the punctures becoming larger caudad and merging with the fovea of the propodeum; pronotal area with sparse, black, erect and recumbent pubescence; the mesonotal area with sparse, recumbent, silvery pubescence and erect black hairs; scutellar scale entirely absent; dorsum, and dorsal half of posterior face of propodeum deeply, very coarsely, contiguously foveate; sparsely clothed with scattered, erect, black hairs, and a small area of recumbent, silvery pubescence on the dorsum; ventral half of posterior face of propodeum finely punctate, indistinctly sculptured, sparsely clothed with silvery pubescence; propleura punctate at the margins, the disk impunctate; a distinct line of dense silvery pubescence between the propleura and the mesopleura; anterior two-thirds of mesopleura finely punctate, clothed with recumbent, silvery pubescence; posterior third of mesopleura coarsely, confluently punctate, with sparse, very long, erect, silvery pubescence, and a spot of rather dense, recumbent, silvery pubescence on the postero-ventral area; metapleura finely punctate, densely clothed with recumbent silvery pubescence; sides of propodeum glabrous impunctate, indistinctly sculptured at the posterior margin.

Abdomen ferruginous; first segment short, nodose; first tergite coarsely, contiguously foveate, indistinctly so on the disk, very coarsely so near the apex, clothed with scattered, erect, pale hairs, and a thin apical fringe of pale pubescence; second tergite with very large, separated, foveate punctures, each bearing an erect hair most of which are black, a few on the disk pale; apical fringes of second and third tergites black, except lateral extremes and median spot silvery; tergites 3–5 with moderate, close punctures, clothed with scattered, long, erect, black hairs, and sparse, recumbent pale pubescence; apical fringe of fourth tergite entirely silvery; apical fringe of fifth tergite black, interrupted medially by a broad spot of silvery pubescence; pygidial tergite with black hairs at the margins; pygidium longitudinally striate, the interspaces between the striae granulate; carina of first sternite prominent, bidentate; second sternite with large, separated, elongate punctures throughout, sparsely clothed with long, erect, pale hairs; apical margins of sternites 3–5 confluently punctate; apical fringes of sternites 2–5 silvery.

Legs ferruginous, sparsely clothed with pale hairs; tibial spines and calcaria black.

Holotype.—Female, Douglas, Arizona, San Bernardino ranch, August (F. H. Snow), in collection of University of Kansas.

Paratype.—Female, Cochise County, San Bernardino ranch. August (F. H. Snow), in collection of University of Minnesota.

Closely related to *texanella* and *sparsa.* It may be distinguished from both by the coarse puncturation of the second abdominal tergite. The apical fringe of the second tergite and the dense pubescence of the metapleura also distinguish it from *texanella.*

GROUP VESTA

Females with the head a little narrower than the thorax; antennal scrobes not at all carinate above; thorax pyriform; scutellar scale present; pygidium striate. Males with anterior margin of pronotum not emarginate medially; posterior third of mesonotum extended laterally each side into a broad, distinct lobe; tegulae punctate throughout; last abdominal tergite with a fringe of hairs at the apical margin; second abdominal tergite without a median pit or a row of hairs simulating a carina.

29. DASYMUTILLA VESTA (Cresson)

Plate 1, fig. 8

Mutilla vesta Cresson, Proc. Phila. Ent. Soc., vol. 4, p. 436, 1865, female—Dalle Torre, Cat. Hymen., vol. 8, p. 96, 1897, female.—Fox, Trans. Amer. Ent. Soc., vol. 25, p. 239, 1899, female.—Melander, Trans. Amer. Ent. Soc., vol. 29, p. 298, 1903, female.—Rucker, Ent. News., vol. 14, p. 75, ?1903, female.

Scolia unicincta PROVANCHER, Natural. Canad., vol. 13, p. 6, 1882, male; Faun. entom. Canada, Hymen., p. 607, 1883, male.

Sphaeropthalma vesta BLAKE, Trans. Amer. Ent. Soc., vol. 13, p. 240, 1886, female.

Sphaeropthalma unicincta PROVANCHER, Addit. faun. Canada. Hymen., p. 251, 1887, male.—GAHAN and ROHWER, Can. Ent., vol. 1, p. 196, 1918, male.

Mutilla monozona DALLE TORRE, Cat. Hymen., vol. 8, p. 64, 1897, male.

Mutilla agenor FOX, Trans. Amer. Ent. Soc., vol. 25, p. 245, 1899, male.—MELANDER, Trans. Amer. Ent. Soc., vol. 29, p. 302, 1903, male.

Ephuta (*Ephuta*) *agenor* ANDRÉ, Gen. Ins., vol. 1, fasc. 11, p. 57, 1903, male.

Ephuta (*Ephuta*) *vesta* ANDRÉ, Gen. Ins., vol. 1, fasc. 11, p. 64, 1903, female.

——— *unicincta* ANDRÉ, Gen. Ins., vol. 1, fasc. 11, p. 74, 1903, male.

Mutilla zella ROHWER, Proc. Ent. Soc. Wash., vol. 12, p. 50, 1910, female.

Pycnomutilla harmonia ROHWER, Proc. U. S. Nat. Mus., vol. 41, p. 455, 1912, male (not female).

Pycnomutilla harmoniiformis ROHWER, Proc. U. S. Nat. Mus., vol. 41, p. 455, 1912, male.

Dasymutilla ferrugatella ROHWER, Proc. U. S. Nat. Mus., vol. 41, p. 458, 1912, female.—BANKS, Ann. Ent. Soc. Amer., vol. 14, p. 26, 1921, female.

Dasymutilla coloradella ROHWER, Proc. U. S. Nat. Mus., vol. 41, p. 458, 1912, female.

Dasymutilla coloradella virginica ROHWER, Proc. U. S. Nat. Mus., vol. 41, p. 459, 1912, female.

Dasymutilla coloradella kamloopsensis ROHWER, Proc. U. S. Nat. Mus., vol. 41, p. 459, 1912, female.

Dasymutilla mesillae ROHWER, Proc. U. S. Nat. Mus., vol. 41, p. 461, 1912, female.

Dasymutilla carolina ROHWER, Proc. U. S. Nat. Mus., vol. 41, p. 462, 1912, female.—BANKS, Ann. Ent. Soc. Amer., vol. 14, p. 26, 1921, female.

Dasymutilla (*Dasymutilla*) *agenor* BRADLEY, Trans. Amer. Ent. Soc., vol. 42, p. 324, 1916, male.

Dasymutilla (*Dasymutilla*) *vesta*, race *zella* BRADLEY, Trans. Amer. Ent. Soc., vol. 42, p. 328, 1916, female.

Bruesia harmonia ROHWER, Bull. 22, Conn. Geol. Nat. Hist. Surv., p. 622, 1916, male (not female).

Bruesia harmoniiformis ROHWER, Bull. 22, Conn. Geol. Nat. Hist. Surv., p. 622, 1916, male.

Dasymutilla vesta ROHWER, Bull. 22, Conn. Geol. Nat. Hist. Surv., p.. 625, 1916, female.

Dasymutilla zella BANKS, Ann. Ent. Soc. Amer., vol. 14, p. 25, 1921, female.—RAU, Trans. Acad. Sci. St. Louis, vol. 24, no. 7, pp. 3–6, 1922.—MICKEL, 19th Rept. State Ent. Minn., p. 105, 1923, female.

Dasymutilla virginica BANKS, Ann. Ent. Soc. Amer., vol. 14, p. 26, 1921, female.

Dasymutilla agenor MICKEL, 19th Rept. State Ent. Minn., p. 106, 1923, female.

Type.—Female, Colorado territory, in collection of American Entomological Society of Philadelphia. The type of *unicincta* is in the Museum of Natural History, Parliament Building, Quebec, Canada. The type of *agenor* is in the collection of the American

Entomological Society of Philadelphia. The types of *harmoniiformis*, *ferrugatella*, *coloradella*, *coloradella virginica*, *coloradella kamloopsensis*, *mesillae*, *carolina*, and *zella* are in the United States National Museum.

Plesiotype.—Male, Conewago, Pa., August 1, 1909, in collection of United States National Museum.

Distribution.—Massachusetts, Connecticut, New York, New Jersey, Pennsylvania, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, Georgia, Florida, Tennessee, Ontario, Michigan, Indiana, Illinois, Missouri, Mississippi, Louisiana, Texas, New Mexico, Arizona, Utah, Colorado, Oklahoma, Kansas, Nebraska, Iowa, Minnesota, South Dakota, North Dakota, Wyoming, Montana, Idaho, British Columbia, Alberta, and Manitoba. (Fig. 8.)

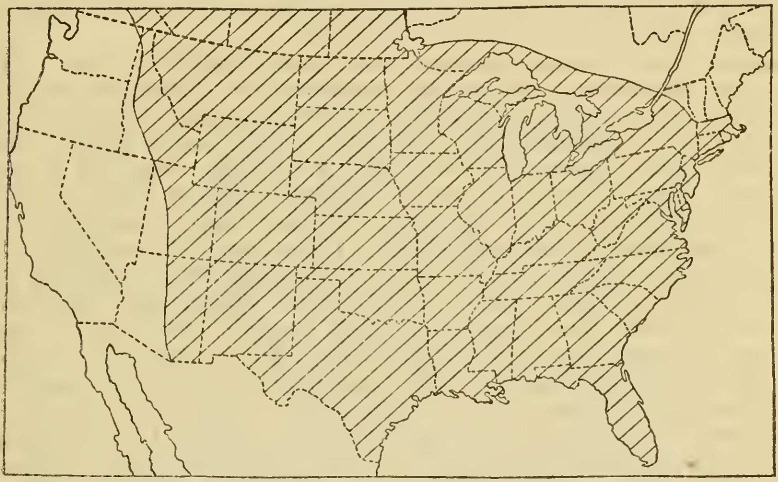

FIG. 8.—DISTRIBUTION OF DASYMUTILLA VESTA (CRESSON)

SPECIMENS EXAMINED

ALBERTA, CANADA: Male, Whitla, September 4, 1922 (W. Carter); male, Lethbridge, May 22, 1923 (H. L. Seamans); female, Lethbridge, May 24, 1923 (E. H. Strickland); 3 males, Lethbridge, July 24, 1923 (H. E. Gray); female, Lethbridge, August 7, 1923 (Walter Carter); male, Lethbridge, August 2, 1923 (H. E. Gray); male, Lethbridge, August 10, 1923 (H. E. Gray); female, male, Lethbridge, September 7, 1921 (E. H. Strickland); 2 females, 2 males, Lethbridge, September 15, 1921 (H. L. Seamans); female, Medicine Hat, April 28, 1923; female, Medicine Hat, May 11, 1923 (F. S. Carr); female, Medicine Hat, May 13, 1923; female, Medicine Hat, May 24, 1923 (F. S. Carr); female, Medicine Hat, June 3, 1923 (F. S. Carr); 2 females, Medicine Hat, June 11, 1923 (F. S. Carr); 2 females, Medicine Hat, June 26, 1923 (F. S. Carr); female, Medicine Hat, June 28, 1923 (F. S. Carr); 2 females, 4 males, Medicine Hat, August 23, 1919 (Sladen); female, May 8, 1921 (H. L. Seamans).

Arizona: Female, Phoenix, April 10, 1902 (Oslar); female, Phoenix (Oslar); female, Winslow (Wickham).

British Columbia, Canada: Male, Summerland, August 9, 1916 (Sladen); male, Summerland, August 10, 1916 (Sladen); female, 3 males, Oliver, July 17, 1923 (P. N. Vroom); female, male, Oliver, July 22, 1923 (E. R. Buckell); male, Nicola, August 3, 1923 (E. R. Buckell); female, Chilcotin, May 15, 1920 (E. R. Buckell); female, Chilcotin, May 29, 1920 (E. R. Buckell); female, Chilcotin, June 18, 1920 (E. R. Buckell); male, Chilcotin, July 23, 1920 (E. R. Buckell); male, Chilcotin, July 29, 1920 (E. R. Buckell); male, Peachland, August 1, 1912 (J. B. Wallis); male, Penticton, August 7, 1916 (Sladen); female, male, Okanagan Falls, July 24, 1917 (Sladen); male, Okanagan, July 30, 1915; female, 2 males, Okanagan; 2 females, Vernon, July 16, 1917 (R. C. Treherne); female, Vernon, July 16, 1920 (N. L. Cutler); male, Vernon, July 17, 1917; male, Vernon, July 25, 1917 (Sladen); female, Vernon; 4 males, Osoyoos, July 26; male, Osoyoos, August 12, 1920 (E. Hearle); female, Osoyoos, August; female, Lillooet, May 30, 1919 (A. W. A. Phair); female, Lillooet, June 30, 1918 (A. W. A. Phair); 2 males, Dog Lake, July, 1895 (J. F.); female.

Colorado: Male, Julesburg, August 4, 1899; female, Fort Collins, June 7, 1900; male, Fort Collins, June 26, 1901; 2 females, Fort Collins, June 29, 1901; 2 males, Fort Collins, July 17, 1900; male, Fort Collins, July 22, 1900; male, Fort Collins, August 9, 1898; male, Fort Collins, August 20, 1903; male, Fort Collins, September 8, 1903; male, Fort Collins, September 10, 1903; male, female, Fort Collins; female, Estes Park, June 8, 1913; male, Estes Park, July, 1892 (F. H. Snow); male, Estes Park, August, 1892 (F. H. Snow); female, White Rocks, Boulder County, July 19 (Cockerell); male, White Rocks, Boulder County, July 30 (Cockerell); female, Boulder, May (Cockerell); female, Golden, August 5, 1906 (Oslar); male, Clear Creek, June 27, 1906 (Oslar); male, Clear Creek, August 5, 1906 (Oslar); 2 males, Turkey Creek Cañon, June (Oslar); male, Platte Cañon, July (Oslar); female, Drennan, August 17, 1924; 2 females, Colorado Springs, June 15–30, 1896 (H. F. Wickham); male, Colorado Springs, June 16, 1895; female, Colorado Springs, August (E. S. Tucker); male, Colorado Springs (Wheeler); male, Avondale, July 17, 1908; female, Canon City (Wickham); female, Florissant, July 4, 1907 (S. A. Rohwer); 4 females, male, Fremont County, September 5; female, Russell, June 25, 1907 (L. Bruner); female, Ute Creek, July 9 (L. Bruner); female, Ute Creek, July 10 (H. S. Smith); male, Salida, July 9, 1898; male, Salida, July 20 (Lantz); female, Salida, July 24, 1906 (W. M. Wheeler); female, Salida, October 1, 1921 (Grace O. Wiley); female, Buena Vista, July 1–6, 1896 (H. F. Wickham); female, Alder, August 25, 1899; female, Gunnison, August, 1899; female, 2 males, Creede, August, 1914 (S. J. Hunter); male, South Park, August 12, 1901 (Oslar); male, South Park, August 19, 1905 (Oslar); male, South Park, August 27, 1901 (Oslar); female, 8 males, Ridgway, July (Oslar); 2 females, 11 males, Silverton, August (Oslar); 6 males, Pagosa Springs (Baker); male, Durango, July 15, 1900 (Oslar); male, Durango, July 17, 1900 (Oslar); 3 males, Durango (Oslar); 2 males, southwest Colorado, July 17, 1901 (Oslar); 3 females, 19 males.

District of Columbia: 2 females, Rock Creek Park, August 26, 1919 (J. C. Crawford).

FLORIDA: Male, Marco, April 18, 1912; male, Estero (Van Duzee); male, Clearwater, April 29, 1908 (Van Duzee); 4 males, Indian River; male, Sanford, April 30, 1908 (Van Duzee); male, Gainesville, March 28, 1922; male, Gainesville, March 31, 1922; male, Gainesville, April 3, 1922; male, Gainesville, April 14, 1922; 2 males, Gainesville, April 24, 1922; male, Gainesville, April 28, 1923; male, Gainesville, May 2, 1922; male, Gainesville, May 4, 1923; 2 males, Gainesville, May 9, 1922; male, Lake City; male, Quincy, May 23, 1905 (W. A. Hooker); male, Funiak, April 7 (H. G. Hubbard); male, Orange Grove (Seifert); 2 males, Carrabelle, September 2–3, 1915 (Rehn and Hebard); female, 2 males.

GEORGIA: 23 males, Spring Creek, Decatur county, May 18–21, 1916 (J. C. Bradley); 4 males, Spring Creek, Decatur county, June 7–23, 1911 (J. C. Bradley); 11 males, Spring Creek, Decatur county, July 16–29, 1912; male, Spring Creek, Decatur county; male, Billy's Island, Okafenokee Swamp, June 8, 1921; 2 males, Billy's Island, Okefenokee Swamp, June; male, St. Simon's Island, June 10, 1911; male, Chesser's Island, August 19, 1922; 2 males, Tifton; male, Atlanta, August 2, 1913; female, Stone Mountain, August 3, 1913; male, Lost Mountain, Cobb county, July 13, 1913; 11 males.

IDAHO: Female, Soda Springs.

ILLINOIS: 5 females, male, Havana.

INDIANA: Female, Posey county, June 18–19, 1914 (H. F. Dietz); female, Spencer, June 30, 1925 (J. A. Harris, Jr.); female, Spencer, July 11, 1925 (J. A. Harris, Jr.); female, Spencer, July 12, 1925 (E. G. Anderson); male, Spencer, July 14, 1925 (E. G. Anderson); 3 males, Vernon, July 9, 1925 (J. A. Harris, Jr.); male, Bloomington, July 8, 1923 (E. G. Anderson).

IOWA: Female, Iowa City, August 4, 1898; male, Ames, September 3, 1896; 3 females, 3 males, Ames; female, Sioux City, July 4, 1922 (C. N. Ainslie); female, Sioux City, July 12, 1922 (C. N. Ainslie); female, Sioux City, July 15, 1920 (C. N. Ainslie); 2 females, Sioux City, July 27, 1923 (C. N. Ainslie); female, Sioux City, August 22, 1922 (C. N. Ainslie); female.

KANSAS: 2 males, Wellsville, August 21, 1901; male, Douglas County, July 2, 1920 (W. E. Hoffmann); female, Douglas County, July 25, 1919 (W. E. Hoffmann); 2 females, Douglas County, July 15, 1922; female, Riley County, June 3 (Popenoe); 2 females, Riley County, June 25 (Popenoe); 3 females, Riley County, June 26 (G. A. Dean); female, Riley County, June 27 (G. A. Dean); female, Riley County, July 3 (Popenoe); 4 females, Riley County, July 5 (Popenoe); female, Riley County, July 11 (Popenoe); female, Riley County, July 12 (Popenoe); female, Riley County, July 17 (Popenoe); 2 females, Riley County, July 18 (G. A. Dean); 2 females, Riley County, July 19 (Popenoe); female, 2 males, Riley County, July 21 (G. A. Dean); 3 females, Riley County, July 21 (Popenoe); 2 males, Riley County, July 22 (G. A. Dean); 3 females, Riley County, July 24 (G. A. Dean); 2 males, Riley County, July 25 (G. A. Dean); female, Riley County, July; female, Riley County, August 5 (G. A. Dean); female, Riley County, August 5 (Popenoe); male, Riley County, August 7 (Popenoe); female, male, Riley County, August 9 (Popenoe); 2 females, Riley County, August 9 (J. B. Norton); female, Riley County, August 12 (G. A. Dean); female, Riley County, August 28 (G. A. Dean); male, Riley County, August 29 (Popenoe); male, Riley County, September 1 (Popenoe); male, Riley County, September 2 (Popenoe); 4 males, Riley County, September 4 (Popenoe); male, Riley County, September 9 (Popenoe); female, Riley

County, September 15 (Popenoe); female, Riley County, September 27 (G. A. Dean); male, Sumner County, 1916 (R. H. Beamer); 2 males, Medora, August 28, 1925 (W. J. Brown); male, McPherson; 2 males, Barton County, June 22, 1912 (F. X. Williams); female, male, Russell County, July 26, 1912 (F. X. Williams); 2 males, Russell County, August 26, 1912 (F. X. Williams); male, Osborne County, August 3, 1912 (F. X. Williams); female, Kiowa County, July 5, 1911 (F. X. Williams); 3 males, Rush County, June 28, 1912 (F. X. Williams); male, Ellis County, July 19, 1912 (F. X. Williams); male, Rooks County, August 9 (F. X. Williams); male, Rooks County, August 27; female, 3 males, Phillips County, August 30, 1912 (F. X. Williams); 2 females, Clark County, May (F. H. Snow); female, Clark County, June (F. H. Snow); 2 males, Clark County, August 23, 1911 (F. X. Williams); 2 males, Ness County, July 5, 1912 (F. X. Williams); male, Ness County, July 7, 1912 (F. X. Williams); female, 5 males, Trego County, July 12, 1912 (F. X. Williams); female, male, Graham County, August 16, 1912 (F. X. Williams); female, male, Norton County, August 24, 1912 (F. X. Williams); 6 males, Meade County, July 10, 1911 (F. X. Williams); female, 2 males, Sheridan County (F. X. Williams); male, Lane County (F. X. Williams); 3 males, Finney County, June, 1895 (H. W. Menke); female, Seward County, June 27 (Lantz); 2 females, male, Seward County, August 16, 1911 (F. X. Williams); female, Seward County, August 18, 1911 (F. X. Williams); female, Scott County (F. X. Williams); female, Logan County (F. X. Williams); 3 males, Thomas County (F. X. Williams); female, male, Rawlins County (F. X. Williams); 3 females, 2 males, Morton County, August 5, 1911 (F. X. Williams); female, 3 males, Morton County (F. H. Snow); 12 females, 10 males, Stanton County, July 30, 1911 (F. X. Williams); 4 females, 2 males, Grant County, July 23, 1911 (F. X. Williams); 2 females, male, Hamilton County (F. H. Snow); 3 males, Greeley County (F. X. Williams); 2 females, Wallace County, July 8; 3 females, 6 males, Wallace County, July, 1885; 5 females, 10 males, Wallace County (F. H. Snow); female, male, Wallace County (F. X. Williams); 5 males, Sherman County (F. X. Williams); 3 males, Cheyenne County (F. X. Williams); 2 males (Snow); 18 females, 5 males (T. B. A.).

LOUISIANA: 2 females, male.

MANITOBA, CANADA: Female, Aweme, June 15, 1917 (N. Criddle); female, Aweme, June 22, 1920 (H. A. Robertson); female, Aweme, July 13, 1904 (J. Fletcher); female, Aweme, July 13, 1907 (H. Skinner); female, Aweme, July 24, 1920 (H. A. Robertson); male, Aweme, August 5, 1920 (H. A. Robertson); female, male, Aweme, August 5, 1920 (P. N. Vroom); female, Aweme, August 24, 1905 (Criddle); male, Aweme, August 27, 1914 (N. Criddle); male, Aweme; male, Treesbank, July 19, 1910 (J. B. Wallis); female, male, Treesbank, July 20, 1910 (J. B. Wallis); female, Treesbank, August 2, 1910 (J. B. Wallis); female, male, Stony Mountain, August 9, 1910 (J. B. Wallis); 2 females, male, Winnipeg.

MARYLAND: Female, Chestertown, August 20, 1899 (E. G. Vanatta); male, Cabin John, August 24, 1914 (J. C. Crawford).

MASSACHUSETTS: Female, Cape Cod, July 4, 1922 (E. G. Anderson); male, Wellfleet, August 16, 1919 (C. W. Johnson); male, West Springfield; female, Sconset, August 4, 1902 (J. L. Zabriskie); male, Woods Hole, July 30, 1922 (E. G. Anderson); female, Woods Hole; female.

MICHIGAN: Female, Ann Arbor, June 5, 1922 (T. H. Hubbell); 5 females, 2 males, Ann Arbor, July 16, 1923 (E. G. Anderson); 7 females, Ann Arbor, July 22, 1923 (E. G. Anderson); 2 females, Ann Arbor, July 25, 1917 (E. G. Anderson); 2 males, Ann Arbor, July 31, 1924 (E. G. Anderson); male, Ann Arbor, August 10, 1924 (E. G. Anderson); 2 males, Ann Arbor, August 23, 1923 (E. G. Anderson); female, Ann Arbor, September 2, 1924 (E. G. Anderson); 13 females, Dexter, July 3, 1923 (E. G. Anderson); female, 3 males, Dexter, July 18, 1923 (E. G. Anderson); 3 males, Dexter, July 19, 1923 (E. G. Anderson); female, 2 males, Dexter, July 23, 1925 (J. A. Harris, Jr.); 4 females, Dexter, July 27, 1924 (E. G. Anderson); male, Dexter, August 3, 1924 (E. G. Anderson); female, 2 males, Dexter, August 31, 1924 (E. G. Anderson); 12 females, male, Dexter, September 14, 1924 (E. G. Anderson); 10 females, male, Dexter, September 16, 1924 (E. G. Anderson); 2 females, Dexter, September 18, 1924 (E. G. Anderson); female, male, Dexter, September 19, 1924 (E. G. Anderson); female, Milford, Oakland County, June 22, 1921 (T. H. Hubbell); female, Milford, Oakland County, September 4, 1921 (T. H. Hubbell); female, Milford, Oakland County, September 6, 1921 (T. H. Hubbell); female, Highland, Oakland County, September 3, 1922 (T. H. Hubbell); 2 females, Jackson, July 22, 1925 (W. M. McComb); 2 females, male, Jackson, July 24, 1925 (G. E. Matson); 4 females, Jackson, July 29, 1925 (G. E. Matson); female, Sand Point, Huron County, June 20, 1922 (R. F. Hussey); female, Sand Point, Huron County, June 23, 1922 (R. F. Hussey); female, Sand Point, Huron County, June 24, 1922 (R. F. Hussey); female, Sand Point, Huron County, June 26, 1922 (R. F. Hussey); 2 males, Whitefish Point, July 23, 1915 (A. W. Andrews); male, Whitefish Point, July 23, 1914 (W. S. McAlpine); female, Whitefish Point, July 26, 1914 (W. S. McAlpine); male, Whitefish Point, July 27, 1914 (W. S. McAlpine); female, Whitefish Point, July 30, 1914 (W. S. McAlpine).

MINNESOTA: Male, Olmstead County, April 27, 1903 (C. N. Ainslie); female, Olmstead County, July (C. N. Ainslie); 3 males, Jordan, July 13, 1923 (C. E. Mickel); female, Scott County, Barden sand dunes, July 29, 1923 (R. W. Dawson); 2 females, male, Fort Snelling, July 27, 1922 (C. E. Mickel); male, Fort Snelling, July 28, 1922 (A. A. Nichol); male, Ramsey County, July 13, 1911; female, Anoka County, Fridley sand dunes, May 28, 1925 (C. B. Philip); 2 females, Anoka County, Fridley sand dunes, May 29, 1923 (C. E. Mickel); 3 females, Anoka County, Fridley sand dunes, June 3, 1923 (Wm. E. Hoffmann); female, Anoka County, Fridley sand dunes, June 6, 1925 (C. B. Philip); female, Anoka County, Fridley sand dunes, June 8, 1923 (Wm. E. Hoffmann); 2 females, male, Anoka County, Fridley sand dunes, June 24, 1923 (C. E. Mickel); male, Anoka County, Fridley sand dunes, June 25, 1923 (R. W. Dawson); 7 females, Anoka County, Fridley sand dunes, June 30, 1923 (Wm. E. Hoffmann); 20 females, 4 males, Anoka County, Fridley sand dunes, June 30, 1923 (H. H. Knight); 3 females, 5 males, Anoka County, Fridley sand dunes, July 3, 1923 (C. E. Mickel); male, Anoka County, Fridley sand dunes, July 13, 1923 (C. E. Mickel); 3 females, Anoka County, Fridley sand dunes, July 14 1923 (A. A. Nichol); female, 2 males, Anoka County, Fridley sand dunes, July 14, 1925 (C. B. Philip); female, 3 males, Anoka County, Fridley sand dunes, July 17, 1923 (C. E. Mickel); 4 females, male, Anoka County, Fridley sand dunes, July 21, 1922 (C. E. Mickel); 17 females, Anoka

County, Fridley sand dunes, July 24, 1922 (Paul Gilmer); 14 females, Anoka County, Fridley sand dunes, July 24, 1922 (C. E. Mickel); 18 females, male, Anoka County, Fridley sand dunes, July 24, 1923 (C. E. Mickel); 41 females, male, Anoka County, Fridley sand dunes, July 26, 1923 (C. E. Mickel); 40 females, Anoka County, Fridley sand dunes, July 26, 1923 (R. W. Dawson); 31 females, 13 males, Anoka County, Fridley sand dunes, July 28, 1922 (Paul Gilmer); 40 females, 7 males, Anoka County, Fridley sand dunes, July 28, 1922 (C. E. Mickel); male, Anoka County, Fridley sand dunes, August 3, 1924 (R. W. Dawson); 56 females, 9 males, Anoka County, Fridley sand dunes, August 8, 1922 (C. W. Johnson); 41 females, 10 males, Anoka County, Fridley sand dunes, August 8, 1922 (A. T. Hertig); female, Pelican Lake, Nisswa, August 11, 1912 (L. Bruner).

MISSISSIPPI: Male, Utica, August; female, Starkville (H. F. Wallace); male, Mt. Olive, September, 1915 (H. L. Miller); male, Agricultural College, March 4. 1922 (F. A. Pitman); female, Agricultural College, April 25, 1922 (C. W. Broomfield); female, Agricultural College, May 20, 1920 (F. R. Bickley); female, Agricultural College, May 21, 1922 (Hewes); female, Agricultural College, May 20, 1915 (E. K. Byram); female, Agricultural College, August 20, 1918 (H. S. Waldener); male, Agricultural College, October 5, 1919 (R. J. Smith); male. Agricultural College, October 26, 1916 (R. G. Pitman); male, Agricultural College (F. H. Jones); male, Summer, 1915 (L. O. Smith).

MISSOURI: Female, Hollister, August 12, 1912 (H. H. Knight).

MONTANA: Female, Glendive, July 18, 1900; male, Miles City, July 21, 1904; male, Miles City, July 22, 1904, male, Forsythe, June 26, 1903; male, Huntley, July 23, 1917; male, Billings, July 30, 1910; female, Bozeman, May 28, 1904; male, Bozeman, August 24, 1912; female, Helena, June 11, 1904; male, Lima, July 11, 1919; 4 females, 12 males, Armstead, July 11, 1919; male, Missoula, July 26, 1904; male, Missoula, July 29, 1904; male, Missoula, August 19, 1904; male, Bonner, August 11, 1904; female, 2 males.

NEBRASKA: Female, Omaha, June 15, 1914 (L. T. Williams); female, Omaha, June 25, 1914 (L. T. Williams); male, Rulo, June 30, 1915 (L. Bruner); female, South Bend, June 23, 1915 (E. G. Anderson); 2 females, South Bend, June 24, 1915 (E. G. Anderson); female, South Bend, June 25, 1915 (E. G. Anderson); male, South Bend, June 30, 1915 (E. G. Anderson); male, South Bend, July 14, 1915 (E. M. Partridge); 2 females, Meadow, June 26, 1915 (E. G. Anderson); male, Louisville, August 1, 1914 (S. H. Emerson); female, Roca, July 4, 1912 (L. M. Gates); female, Lincoln, June 18, 1900 (R. H. Wolcott); female, Lincoln, June 27, 1900 (R. W. Dawson); 2 females, male, Lincoln, July 4, 1920 (R. W. Dawson); 3 females, Lincoln, July 11, 1920 (C. E. Mickel); 3 females, male, Lincoln, July 18, 1920 (R. W. Dawson); 2 females, Lincoln, August 24, 1916 (C. E. Mickel); female, Lincoln, August 24, 1916 (M. H. Swenk); 2 females, Lincoln, September 9, 1924 (R. W. Dawson); female, Lincoln, September 20, 1909 (J. T. Zimmer); 2 males, West Point, June 24; female, West Point, June, 1887; female, Maskel, July 16, 1915 (E. G. Anderson); female, Springview Bridge, June 20, 1902 (W. D. Pierce); male, Rock County, July 22, 1902 (W. D. Pierce); female, Halsey, June; male, Halsey, July 23, 1912 (J. T. Zimmer); 2 males, Halsey, August 9, 1925 (R. W. Dawson); male, Halsey, August 11, 1925 (R. W. Dawson); 3 females, 4 males, Halsey, August 13, 1920 (C. B. Philip); female, 2 males, Halsey, August 13, 1925 (R. W. Dawson); 3 females, 4 males, Halsey, August 14, 1920 (C. B. Philip); female, male, Halsey, August 14, 1925 (R. W. Dawson); female, 3 males, Halsey, August

15, 1925 (R. W. Dawson); 4 females, 5 males, Halsey, August 16, 1925 (R. W. Dawson); 4 males, Halsey, August 19, 1920 (C. B. Philip); male, Halsey, August 20, 1920 (C. B. Philip); 2 females, Halsey, August 28, 1911 (J. T. Zimmer); 3 females, 4 males, Halsey, August 29, 1924 (R. W. Dawson); female, Halsey, August 30, 1924 (R. W. Dawson); 2 males, Halsey, August 31, 1924 (R. W. Dawson); 2 females, Halsey, September 1, 1924 (R. W. Dawson); male, Halsey, September 2, 1924 (R. W. Dawson); 7 females, 2 males, Halsey, September 3, 1924 (R. W. Dawson); 3 females, Dismal River, July; 2 females, Sand Hills, July; 2 females, Sand Hills, September; female, McCook, June 20, 1913 (R. W. Dawson); female, North Platte, July 23, 1912 (L. M. Gates); female, male, Ogallala, June 24, 1913 (R. W. Dawson); male, Haigler, August 20, 1909 (C. H. Gable); female, Bridgeport, July 11, 1917 (C. E. Mickel); 2 males, Pine Bluffs, August 27, 1893; female, Scottsbluff, August 5, 1923 (Leonard Worley); female, Mitchell, June 28, 1916 (C. E. Mickel); female, Mitchell, June 29, 1916 (R. W. Dawson); female, Mitchell, July 9, 1914 (L. M. Gates); female, male, Mitchell, July 19, 1912 (L. M. Gates); female, Mitchell, July 25, 1915 (L. M. Gates); female, Mitchell, July 28, 1917 (C. E. Mickel); female, Mitchell, August 3, 1915 (E. M. Partridge); male, Mitchell, August 26, 1915 (E. M. Partridge); female, Box Butte County, September; 2 females, Glen, July 12, 1910 (L. Bruner); female, Glen, August 7, 1905; male, Glen, August 9, 1905; male, Glen, August 10. 1905; male, Glen, August 15, 1905; female, Glen, August 20, 1906 (H. S. Smith); male, Glen, August 20, 1906; male, Harrison, August 4, 1908 (R. W. Dawson); 3 males, Harrison, August 4, 1908 (C. H. Gable); male, Harrison, August 9, 1908 (R. W. Dawson); male, Harrison, August 15, 1908 (C. H. Gable); male, Monroe Canyon, Sioux County, June 25, 1911 (R. W. Dawson); female, Monroe Canyon, Sioux County, August 16, 1912 (E. J. Taylor); female, Monroe Canyon, Sioux County, August 20, 1908 (J. T. Zimmer); male, Monroe Canyon, Sioux County, August 24, 1908 (J. T. Zimmer); female, Warbonnet Canyon, Sioux County, July (M. A. Carriker, Jr.); female, male, Warbonnet Canyon, Sioux County; 2 females, Pine Ridge, July; female, Bad Lands, Sioux County, August 10, 1908 (J. T. Zimmer); male, Bad Lands, Sioux County, August 10, 1908 (R. W. Dawson); male, Hat Creek Basin, Sioux County, August 28, 1912 (E. J. Taylor); male, Sioux County, July; 2 females, Sioux County.

New Jersey: Female, Cape May County, August, 1910 (W. T. Davis); male, Manumuskin, June 21, 1903; male, Manumuskin, June 22, 1899; female, Manumuskin, August 17, 1902 (E. Daecke); male, Manumuskin, September 15, 1902 (E. Daecke); male, Manumuskin, October 20, 1902; 2 females, Menanticho, July 27, 1923; female, male, Iona, June 8, 1902; 2 females, Iona, June 16, 1902; female, Iona, July 13, 1902 (E. Daecke); 2 males, Iona, August 25, 1902; 2 females, male, Weymouth, July 25, 1923; female, Reega, July 26, 1923; 2 males, Wilson's Landing, July 26, 1923 (J. C. Bradley); female, Andrews, May 13; female, Westville, August 11, 1897; female, Westville, August 19, 1897; 2 females, Clementon, May 24, 1902; male, Clementon, August 27, 1905 (G. M. Greene); 2 males, Ateo, September 7, 1901; male, Ateo, September; male, Birmingham, July 6, 1919; 2 males, Mount Holly, August 19, 1906; 3 females, Trenton, August 6, 1911; male, Helmetta, September 21, 1909 (W. T. Davis); male, South Amboy; 3 females, Da Costa, July 19; 2 females, Da Costa, July 20, 1902; 5 females, Da Costa, July 28, 1902; female, Da Costa, August 3, 1902; female, Lakehurst, June 1, 1912 (W. T. Davis); 2 females, Lakehurst, July 5, 1912;

female, Lakehurst, July 5, 1909; male, Lakehurst, September 4; 2 females, male, Lakehurst; female, Lucaston, July 2, 1902 (E. Daecke); 3 males, Lucaston, September 24, 1901; female, North Woodbury, June 22, 1901; male, Adela, September 2; 2 males, Big Timber creek, September 22, 1901; 2 males.

New Mexico: Male, Albuquerque, July 17, 1902 (Oslar); female, Albuquerque, July 19, 1902 (Oslar); male, Albuquerque, August, 1894 (Snow); male, Albuquerque (Oslar); female, Aztec; female, Jemez Springs, May 15, 1915 (John Woodgate); male, Jemez Springs, June 24, 1916 (John Woodgate); female, Jemez Springs, June 29, 1916 (John Woodgate); female, male, Jemez Springs, July 1, 1916 (John Woodgate); female, Jemez Springs, July 3, 1916 (John Woodgate); male, Jemez Springs, July 9, 1916 (John Woodgate); male, Jemez Springs, July 25, 1916 (John Woodgate); female, Jemez Springs, July 31, 1914; female, Jemez Springs, August 4, 1913 (John Woodgate); female, Jemez Springs, August 19, 1916 (John Woodgate); female, Barela Mesa (Miss Anna Gohrman); male, Sierra Naciemento; male, Las Vegas, July 11; female, Mesilla, June 15 (Cockerell); female, Mesilla, September 3 (Cockerell).

New York: Female, Yaphank, July 12; male, Yaphank, August 25, 1911; male, Central Park, L. I., August; 3 females, Cold Springs Harbor, L. I., June 17, 1923 (E. G. Anderson); male, Cold Springs Harbor, L. I., June 27. 1921 (E. G. Anderson); female, Cold Springs Harbor, L. I., July 9, 1921 (E. G. Anderson); female, Cold Springs Harbor, L. I., August 25, 1921 (E. G. Anderson); male, Mosholu, August 9, 1898; male, Nyack, 1883; female, male.

North Carolina: Male, Southern Pines, September 1, 1907 (A. H. Manee); male, Southern Pines, July 10, 1918; 2 males, Southern Pines, September 26, 1918; male, Southern Pines; male, Valley of Black Mountains, August 25, 1906 (W. Beutenmuller); male, Nance, June 16, 1906; female, male.

North Dakota: 5 males, northeast North Dakota; male, Sheldon, August 28, 1920 (O. A. Stevens); female, Steele, August 18, 1922 (O. A. Stevens); 2 females, Moffit, August 22, 1922 (O. A. Stevens); female, Devil's Lake, July 11, 1920 (T. H. Hubbell); 2 females, 2 males, Devil's Lake, July 17, 1920 (T. H. Hubbell); female. Devil's Lake, July 21, 1920 (T. H. Hubbell); female, Bottineau, August 19, 1923 (C. N. Ainslie); 4 females, Bottineau, August 23, 1923 (C. N. Ainslee); 2 females, 2 males, Cannon Ball, August 20, 1922 (O. A. Stevens); 4 females, 19 males, Medora, August 3, 1923 (O. A. Stevens); 3 males, Beach, August 22, 1921 (C. N. Ainslie); female, Beach, August 25, 1923 (C. N. Ainslie); female, Beach, September 5, 1922 (C. N. Ainslie); female, Beach, September 15, 1922 (C. N. Ainslie); 3 females, Beach; female, Marmarth, July 4, 1918 (O. A. Stevens); female, Amidon, June 12, 1923 (C. N. Ainslie); male, Bad Lands, July 15, 1920 (A. A. Nichol); female, male.

Ontario, Canada: 2 females, Rondeau; female, Point Pelee, July 10, 1920 (N. K. Bigelow); male, Point Pelee, July 15, 1920 (N. K. Bigelow); female, Salines, July 20, 1915 (H. S. Parish).

Oklahoma: Female, Payne County, May 17, 1924 (W. J. Brown); female, Payne County, June 3, 1925 (W. J. Brown); male, Payne County, June 20, 1925 (W. J. Brown); female, Payne County, June 28, 1925 (W. J. Brown).

Pennsylvania: Female, Lehighgap, June 25, 1901; female, Lehighgap, July 3, 1901; male, Lehighgap, July 15, 1900; 2 males, Linglestown, September 19, 1909 (Kirk and Champlain); female, Marysville, September 1, 1913;

female, Euterline, July 19, 1912 (E. Daecke); male, Charter Oak, July 11, 1917 (H. B. Kirk); male, Rockville, August 4, 1912; female, Hackton Mills, August 21, 1920.

South Dakota: Female, Elk Point, June 19, 1924 (H. C. Severin); female, Brookings, June 22, 1891 (H. C. Severin); 2 females, male, Brookings; female, male, Platte, July 20, 1923 (C. N. Ainslie); female, Martin, June 16, 1925 (H. C. Severin); female, Martin, September 3, 1923; 2 females, Martin, September 3, 1924 (H. C. Severin); 7 females, Buffalo, July 31, 1924; male, Hot Springs, July 1, 1924; male, Hot Springs, July 1, 1924; female, Hot Springs, July 10, 1924; male, Hot Springs, July 12, 1924; male, Hot Springs; female, Redig, July 30, 1924; male, Wasta, September 12, 1923; 4 females, 2 males.

Tennessee: Female, Monroe County, July 6, 1890; female, Caney Spring, June 18, 1918 (G. G. Ainslie); female, Leakwood, July 19, 1915 (H. V. Harris); male, Chattanooga, July 4, 1922 (T. H. Hubbell); male, Chattanooga, July 5, 1922 (T. H. Hubbell); female, Allardt, August 18, 1922 (T. H. Hubbell); 2 females, Allardt, August 20, 1922 (T. H. Hubbell); 2 males, Allardt, August 23, 1922 (T. H. Hubbell); male, Grassy Cove, July 7, 1922 (T. H. Hubbell); male, Grassy Cove, July 8, 1922 (T. H. Hubbell); female, Grassy Cove, July 12, 1922 (T. H. Hubbell); male, Grassy Cove, July 15, 1922 (T. H. Hubbell).

Texas: Female, 2 males, Beaumont, August, 1918 (G. E. Riley); female, Columbus (Wickham); male, Dayton, August, 1918 (G. E. Riley); 2 males, Trinity, August 24, 1907 (W. W. Yothers); female, Jacksonville, August 1, 1906 (F. C. Bishopp); male, Mineola, July 19, 1906 (Bishopp and Jones); male, Paris, October 26, 1904 (C. R. Jones); male, College Station, June 20, 1919 (H. J. Reinhard); male, College Station, May 27, 1907 (F. C. Pratt); male, College Station, July 11, 1917 (H. J. Reinhard); male, College Station, September 3, 1916 (H. J. Reinhard); male, Lee County, May 24, 1906; male, Lee County, July, 1906; female, Lee County, August, 1905; male, Lee County, September 13, 1905; female, Fedor; female, Rosser, September 23, 1905 (C. R. Jones); female, Victoria, June 22, 1906 (W. E. Hinds); male, Victoria, July 26, 1906 (F. C. Pratt); 2 males, Victoria, August 13, 1902 (W. E. Hinds); male, Handley, June 19, 1906 (F. C. Pratt); female, Willow City, May 26, 1906 (F. C. Pratt); female, male, Richmond, May 29, 1918 (J. C. Bradley); 3 males, Richmond, June 22, 1917; 4 females, Del Rio, June 22–27 (Wickham); 2 females, Brewster County, June 13–17, 1908 (Mitchell and Cushman); 2 males.

Utah: Male, Vineyard, August 31, 1908 (Tom Spaulding); male, Provo, September 6, 1908 (Tom Spaulding); female, Logan, August 2, 1926 (A. C. Burrill); 2 females, Beaver Dam, July 28, 1921.

Virginia: Female, Falls Church, June 27, 1913 (W. Middleton); female, Falls Church, August 4, 1913 (H. B. Kirk); male, Falls Church, August 14, 1913 (C. T. Greene); male, Falls Church, August 30, 1912 (W. Middleton); female, 3 males, Falls Church, September 1, 1915 (C. T. Greene); 2 males Vienna, September 1, 1911 (C. W. Hooker); male, Great Falls, July 8, 1914 (R. P. Currie).

West Virginia: 7 males, Milville (J. C. Bradley).

Wyoming: Female, Cheyenne (Wickham); 2 males, Laramie, August 5, 1920 (H. Skinner); female, Paint Creek, July 29, 1896 (R. P. Currie); 2 females, 10 males, 40 miles north of Lusk, July, 1895; female, male, 30 miles north of Lusk, July, 1895; female, National Park, July 30.

This seems to be the most widely distributed species of *Dasymutilla* in the fauna of the United States. There can be little question that *agenor* Fox is the male. *Vesta* occurs all through the Northern States and Canada as far west as British Columbia and also in the Southern States from the Atlantic coast to Arizona, and is the only species of which the females are found so widely distributed. *Agenor* also occurs throughout the same region and is the only species of which the males exhibit such a wide distribution. In regions such as British Columbia, Alberta, Manitoba, Montana, and North Dakota *agenor* is the only male *Dasymutilla* found in collections which could possibly be the male sex of *vesta.* On the basis of the data of geographical distribution I have therefore considered them as the two sexes of the same species. The male may be easily recognized by the punctate tegulae, the absence of a median pit on the second abdominal sternite and by the form of the mesonotum; the posterior third of the latter is extended laterally each side into a distinct lobe.

Although I (1923) previously stated that *zella* Rohwer was distinct from *vesta* Cresson, I have been forced to conclude that only one species is involved after an examination of over one thousand specimens from the localities listed above, and a critical study of the types. Numerous variations in color of pubescence and puncturation are to be found in the material studied but in practically every case where variations are present, typical specimens are at hand from the same localities. Certain female specimens from Manitoba, North Dakota, Montana, Alberta, and British Columbia have the pubescence on the head and the dorsum of the thorax blackish rather than ferruginous; some female specimens from Kansas, Nebraska, Colorado, Oklahoma, and Texas have the broad band at the apex of the second abdominal tergite silvery, narrowly interrupted medially with black, and the apical fringe of the first tergite silvery, narrowly interrupted medially with black. In typical specimens the apical margins of both the first and second tergites are almost entirely black, the lateral extremes only, with silvery pubescence. Many specimens from Nebraska, Colorado. Kansas, Oklahoma, and Texas have the legs reddish, while in typical specimens the legs are almost black. Bradley (1916) has pointed out that the form of the carina on the first abdominal sternite of the female is not at all constant. The form of this carina seems to be subject to individual variation and has little taxonomic significance other than the fact that it is always more or less bidentate. None of these variations are constant within any particular geographical region. Bradley (1916) has also mentioned that eastern specimens seem to be less pubescent than western ones. This may be true to a certain extent, but some eastern specimens in the material studied are quite as pubescent as any of the western ones. None of the variations mentioned above seem to me to be of sufficient significance or stability to warrant their designation with varietal names.

I have examined the types of *vesta*, *zella*, *coloradella*, *coloradella virginica*, *coloradella kamloopsensis*, *ferrugatella*, *carolina*, and *mesillae* and find them to be either identical with, or slight variations of *vesta*. Typical male specimens have the base and apical margin of the second abdominal tergite black, but certain specimens from New Jersey, Virginia, North Carolina, Florida, Colorado, Kansas, and Texas have the ferruginous color much extended anteriorly. Some specimens have the first and second segments entirely black, others may have the ferruginous color extending onto the thorax, so that it may be partially, or rarely even entirely suffused with ferruginous, and not entirely black as is usually the case. Small specimens have the puncturation less coarse than the larger ones, although most specimens from North Carolina and Florida have the second abdominal tergite less coarsely punctured than specimens from other regions. I have examined the type of *agenor* and the material included here is identical with it. I have examined the male of *Pycnomutilla harmonia* Rohwer, the types of *Pycnomutilla harmoniiformis* Rohwer and *Scolia unicincta* Provancher, and find them to be the same as the male of this species. The females vary in length from 6 to 12 mm. and the males from 8 to 16 mm.

30. DASYMUTILLA VESTA var. SAPPHO (Fox)

Mutilla sappho Fox, Trans. Amer. Ent. Soc., vol. 25, p. 239, 1899, female.

Ephuta (*Ephuta*) *sappho* André, Gen. Ins., vol. 1, fasc. 11, p. 63, 1903, female.

Dasmutilla (*Dasymutilla*) *sappho* Bradley, Trans. Amer. Ent. Soc., vol. 42, p. 330, 1916, female.

Dasymutilla sappho Banks, Ann. Ent. Soc. Amer., vol. 14, pp. 25, 26, 1921, female.

Type.—Female, Georgia, in collection of American Entomological Society of Philadelphia.

Distribution.—North Carolina, Georgia, and Florida.

SPECIMENS EXAMINED

Florida: Female, Fort Myers, March 31, 1912; female, Fort Myers, April 2, 1912; female, LaBelle, May 8–10, 1916 (J. C. Bradley); female, Lakeland, August 16, 1910 (J. C. Bradley); 2 females, Indian River; female, Coronado Beach, May 5, 1916 (J. C. Bradley); female, Sanford, April 30, 1908 (Van Duzee); female, Gainesville, September 26–October 2, 1914; female, De Funiak Springs, October 17–19, 1914; female, Crestview, October 15–16, 1914; 3 females, Pensacola, October 11–14, 1914.

Georgia: 14 females, Spring Creek, Decatur county, May 18–21, 1916 (J. C. Bradley); 2 females, Spring Creek, Decatur county, June 7–23, 1911 (J. C. Bradley); 4 females, Spring Creek, Decatur county, July 16–29, 1912; female, Spring Creek, Decatur county, September 23–October 3, 1910 (J. C. Bradley); female, Cumberland Island, April 29, 1911; 2 females, St. Simon Island, April 22–May 12, 1911 (J. C. Bradley); female, St. Simon Island, June 3. 1911; female, Tybee Island, July 26, 1913; female, Unadilla, June 25, 1910 (J. C. Bradley).

North Carolina: Female, Southern Pines, June 24, 1909; female, Southern Pines, June 25, 1911 (A. H. Manee).

Sappho is almost a duplicate of *vesta* in form and sculpture, although there is a tendency for the sculpture to be less coarse than in *vesta*. Bradley (1916) has already pointed out the very close relationship between the two and after studying material of both forms I believe *sappho* to be only a variety of *vesta*. The variety *sappho* differs from *vesta* in being much more sparsely pubescent, the legs red, apical fringe of first abdominal tergite entirely silvery, and apical fringe of second tergite silvery, narrowly interrupted medially by a spot of black.

31. DASYMUTILLA VESTA var. ERRANS Rohwer

Dasymutilla errans Rohwer, Proc. U. S. Nat. Mus., vol. 41, p. 457, 1912, female.—Banks, Ann. Ent. Soc. Amer., vol. 14, p. 26, 1921, female.

Dasymutilla bosquensis Rohwer, Proc. U. S. Nat. Mus., vol. 41, p. 457, 1912, female.

Dasymutilla texensis Rohwer, Proc. U. S. Nat. Mus., vol. 41, p. 460, 1912. female.

Type.—Female, Texas, in collection of United States National Museum. The types of *bosquensis* and *texensis* are in the collection of the United States National Museum.

Distribution.—Texas, Oklahoma, Kansas, Nebraska, South Dakota, and Colorado.

SPECIMENS EXAMINED

Colorado: Female, Ridgway, July (Oslar).

Kansas: Female, Riley County, July 11 (Popenoe); female, Riley County, July 19 (G. A. Dean); female, Riley County, July 21 (Popenoe); female, Riley County, July 24 (G. A. Dean); female, Barton County, June 22, 1912 (F. X. Williams); female, Kiowa County, July 5, 1911 (F. X. Williams); female, Phillips County, August 30, 1912 (F. X. Williams); female, Clark County, May (F. H. Snow); 3 females, Clark County, June (F. H. Snow); 2 females, Clark County, August 23, 1911 (F. X. Williams); female, Graham County, August 16, 1912 (F. X. Williams); female, Sheridan County (F. X. Williams); 2 females, Seward County, August 18, 1911 (F. X. Williams); female, Logan County (F. X. Williams); female, Rawlins County (F. X. Williams); female, Stevens County, August 10, 1911 (F. X. Williams); 2 females, Grant County, July 23, 1911 (F. X. Williams); 3 females, Morton County (F. H. Snow); 3 females, Hamilton County (F. H. Snow); 9 females, Stanton County, July 30, 1911 (F. X. Williams); 3 females, Wallace County (F. H. Snow).

Nebraska: Female, Halsey, August 9, 1925 (R. W. Dawson); female, Halsey, August 13, 1920 (C. B. Philip); female, Scottsbluff, August 5, 1923 (Leonard Worley).

Oklahoma: Female, Payne County, June 28, 1925 (W. J. Brown).

South Dakota: Female, Martin, September 12, 1925 (H. C. Severin).

TEXAS: Female, Arlington, August 6, 1908 (F. C. Bishopp); female, Childress, June 8, 1906 (J. D. Mitchell); female, Texas (Belfrage); 2 females, Richmond, June 22, 1917.

The variety *errans* is very similar to the variety *sappho.* The apical fringes of the first and second abdominal tergites of *errans* are exactly like those of *sappho. Errans*, however, is more pubescent, like *vesta*, and the legs and body are paler ferruginous than in *sappho.* In form and puncturation *errans* is similar to typical *vesta.* I have examined the types of *bosquensis* Rohwer, and *texensis* Rohwer and find them to be the same as *errans.*

32. DASYMUTILLA COLUMBIANA, new species

Male.—Black, the second abdominal tergite above mostly yellowish ferruginous; head, thorax, and legs clothed with silvery gray pubescence; abdomen with black pubescence except the yellow maculation of the second tergite with yellowish pubescence; tegulae punctate throughout; posterior third of mesonotum extended laterally into a distinct lobe; apical margin of last abdominal tergite with a distinct fringe of erect hairs; second abdominal sternite without a median pit or row of hairs simulating a carina.

Head black, clothed with sparse, erect and appressed, silvery gray pubescence; mandibles tridentate at the tips; apical margin of clypeus distinctly bidentate medially; clypeus densely, moderately punctate; scape feebly bicarinate beneath; coarsely punctate; first segment of flagellum distinctly shorter than the second; antennal scrobes not carinate above; front and vertex densely, somewhat confluently punctate; genae with distinct, separated punctures; relative widths of head and thorax, 5.75–6.75.

Thorax black, clothed with sparse, erect and appressed, silver gray pubescence; cephalic margin of pronotum not at all emarginate medially; pronotum, mesonotum, and scutellum coarsely, confluently punctate; posterior third of mesonotum extended each side into a distinct lobe; tegulae punctate throughout; propleura with coarse, contiguous punctures anteriorly, indistinctly punctate posteriorly; mesopleura with coarse, distinct punctures throughout, separated and intermixed with fine punctures anteriorly, contiguous medially and posteriorly; metapleura glabrous, the ventral third coarsely punctate; sides, posterior face, and dorsum of propodeum coarsely foveately reticulate.

Abdomen black, the second tergite yellowish ferruginous, except the broad basal and narrow apical margins black; clothed with long, sparse, erect, black pubescence, except that of the maculation of the second tergite yellow, first abdominal segment strongly nodose; first tergite densely, deeply, somewhat confluently punctate; second tergite with distinct, deep, elongate, moderate punctures; tergites 3–6 with small, distinct punctures, the punctures on tergite 3 larger than those on 6; last tergite with an apical fringe of short, erect, black hairs; first sternite coarsely, densely punctate, with a sharp, median, longitudinal carina; second sternite with sparse, distinct punctures, without a median pit filled with hairs, or a row of hairs simulating a carina; sternites 3–6 with small punctures at their apical margins; last sternite with small, close punctures, except the apical fifth glabrous, impunctate.

Legs black, clothed with sparse, silvery gray pubescence; calcaria black.

Wings dark fuliginous; call 2nd R_1+R_2 broadly truncate at the apex; cell R_4 obsolete; vein M_{3+4} received by cell R_5 about one-fourth the distance from the base to the apex; veins r–m and R_5 widely separated on vein r.

Holotype.—Male, Nicola, British Columbia, August 3, 1923 (E. R. Buckell), in Canadian National collection, Ottawa, Canada.

This species is very close to the male of *vesta* and may prove to be only a variety of that species. It can be easily distinguished from *vesta* by the silvery gray pubescence of the head, thorax, and legs.

GROUP ZELAYA

Females with mandibles bidentate; thorax subhexagonal, either as broad as long, or slightly longer than broad; scutellar scale either present or absent; pygidial area irregularly rugose. Males with the cephalic margin of the pronotum emarginate medially, second sternite without a median pit filled with hairs or a row of hairs simulating a carina; last abdominal tergite without an apical fringe of hairs.

33. DASYMUTILLA ZELAYA (Blake)

Plate 1, fig. 9

Mutilla (*Sphaerophthalma*) *zelaya* BLAKE, Trans. Amer. Ent. Soc., vol. 3, p. 234, 1871, male.

Sphaerophthalma zelaya BLAKE, Trans. Amer. Ent. Soc., vol. 13, p. 211, 1886, male.

Mutilla zelaya DALLE TORRE, Cat. Hymen., vol. 8, p. 99, 1897, male.—FOX, Trans. Amer. Ent. Soc., vol. 25, p. 244, 1899, female, male.—MELANDER, Trans. Amer. Ent. Soc., vol. 29, p. 302, 1903, female, male.

Ephuta (*Ephuta*) *zelaya* ANDRÉ, Gen. Ins., vol. 1, fasc. 11, p. 65, 1903, male.

Type.—Male, Texas, in collection of American Entomological Society of Philadelphia.

Plesiotype.—Male, Eastland County, Texas, August 25, 1920 (Grace Olive Wiley), in entomological collection of University of Minnesota.

Distribution.—Texas, New Mexico and Arizona.

SPECIMENS EXAMINED

ARIZONA: Female, Nogales, July 17, 1903 (Oslar); female, Huachuca Mountains, August 27, 1903 (Oslar); female, Huachuca Mountains, September 12, 1903 (Oslar); female, Tucson, July 30, 1921; female Tucson, October 2–25, 1916; female, Sabino Canyon, St. Catalina Mountains, May 20, 1919; female, Sabino Basin, St. Catalina Mountains, July 8–20, 1916; female, Phoenix; female, Santa Cruz Village, Cobabi Mountains, August 10–12, 1916; female, Dawson Camp, Salt River, September 3 (C. H. T. Townsend); female, Yuma county, September, 1903.

NEW MEXICO: Male, Albuquerque, July 17, 1902 (Oslar); male, Albuquerque, July 18, 1902 (Oslar); male, Albuquerque, August, 1894 (Snow).

TEXAS: Male, Gillette, July 25, 1917; male, Lee County; male, Calvert (G. H. Harris); female, Harwood (Wickham); male, Dallas, October 3, 1905 (F. C. Bishopp); male, Brownwood, 1891; male, Eastland County, June 9, 1921 (Grace O. Wiley); male, Eastland County, June 10, 1921 (Grace O. Wiley); female, New Braunfels, June 16 (Wickham); female, Marfa, July 3–6 (Wickham); female, Del Rio, June 22–27 (Wickham); female, Devils River, May 3, 1907 (F. C. Bishopp); female, Phantom Lake, Fort Davis Quad, June 9, 1916 (F. M. Gaige); female, Phantom Lake, Fort Davis Quad, June 14, 1916 (F. M. Gaige); female, 2 males, Phantom Lake, Fort Davis Quad, July 12, 1916 (F. M. Gaige); female, Phantom Lake, Fort Davis Quad, July 13, 1916 (F. M. Gaige); female, Phantom Lake, Fort Davis Quad, July 15, 1916 (F. M. Gaige); male.

The type of this species has been examined and the males placed here are identical with it. I have also compared the females with the specimen described by Fox as the female. There is some question in my mind as to whether this is really the female of this species. The bidentate mandibles, subhexagonal thorax without a scutellar scale, irregularly rugose pygidium, and black head and thorax will identify the female. The strongly emarginate cephalic margin of the pronotum, absence of a median pit on the second abdominal sternite, lack of an apical fringe on the last abdominal tergite, and the black head and thorax will identify the male.

34. DASYMUTILLA MYRICE, new species

Mutilla ochracea Fox, Trans. Amer. Ent. Soc., vol. 25, p. 243, 1899, male (part).

Male.—Black, the vertex, dorsum of thorax, and abdomen from apical margin of second tergite clothed with yellow pubescence, otherwise with black pubescence; cephalic margin of pronotum distinctly emarginate medially; last abdominal tergite with an apical fringe of short, black, erect hairs; second abdominal sternite without a median pit filled with hairs, or a longitudinal row of hairs simulating a carina. Length, 13 mm.

Head black, clothed with sparse, long, erect, black pubescence, except that on the vertex yellow; mandibles acute at the apex, bidentate on the inner margin; apical margin of clypeus bidentate medially; clypeus densely, confluently punctate; scape bicarinate beneath, one carina prominent, sharp, the other almost obsolete; scape coarsely punctate above; first segment of flagellum distinctly shorter than the second, seen from above, subequal to the second, seen from beneath; antennal scrobes carinate above; front densely, coarsely punctate; vertex with the punctures slightly larger, close, more or less confluent; genae with moderate, confluent punctures, not as coarsely sculptured as the front and vertex; relative widths of head and thorax, 6.75–8.

Thorax black, clothed with sparse, long, erect, black pubescence, except that on the pronotum, mesonotum, and scutellum yellow; cephalic margin of pronotum distinctly emarginate, the face of the emargination glabrous, impunctate; pronotum, mesonotum, and scutellum densely, coarsely, and deeply punctate; propleura densely, coarsely punctured anteriorly, posteriorly with intermixed moderate and fine punctures; mesopleura with large, distinct punctures, anteriorly, elsewhere with large, dense, contiguous punctures; metapleura glabrous, impunctate except for coarse, scattered punctures ventrally; sides, posterior face, and dorsum of propodeum coarsely, foveately reticulate; tegulae glabrous, impunctate, except the basal and inner lateral margins setigerously punctate.

Abdomen black, clothed with sparse, long, erect, black pubescence, except that of the apical fringe of the second tergite, that on tergites 3–6, and on basal third of last tergite, yellow; first segment strongly nodose; first tergite densely, coarsely, deeply confluently punctate; second tergite with moderate, contiguous punctures on the disk, dense and coarse punctures basally and laterally; tergites 3–6 with small, dense punctures; apical tergite rugose, with an apical fringe of short, erect, black hairs; first sternite punctured, and with a prominent, longitudinal median carina, produced posteriorly into a tooth; disk of second sternite very slightly concave, with sparse, moderate punctures, elsewhere the second sternite with large, deep, almost contiguous punctures; sternites 3–6 with small, scattered punctures apically; last sternite closely punctate on the disk, the margins glabrous, impunctate.

Legs black, clothed with sparse, long, black pubescence. Calcaria black.

Wings dark fuliginous; cell 2nd R_1+R_2 broadly truncate at the apex; cell R_4 indistinct; vein M_{3+4} received by cell R_5 about one-fourth the distance from the base to the apex; veins r–m and R_5 approximate on vein r.

Holotype.—Male, Grant County, Kansas, July 27, 1911 (F. X. Williams), in collection of University of Kansas.

Paratypes.—3 males, Russell County, Kansas, July 26, 1912 (F. X. Williams); 2 males, Osborne County, Kansas, August 3, 1912

(F. X. Williams); 3 males, Rooks County, Kansas, August 9, 1912 (F. X. Williams); 2 males, Rooks County, Kansas, August 27; 2 males, Comanche County, Kansas, 1916 (R. H. Beamer); male, Norton County, Kansas, August 24, 1912 (F. X. Williams); 5 males, Meade County, Kansas, July 10, 1911 (F. X. Williams); male, Meade County, Kansas; male, Seward County, Kansas, August 16, 1911 (F. X. Williams); male, Seward County, Kansas, August 18, 1911 (F. X. Williams); male, Grainfield, Kansas, September 23 (Lantz); 15 males, Grant County, Kansas, July 23, 1911 (F. X. Williams); 7 males, Grant County, Kansas, July 27, 1911 (F. X. Williams); 5 males, Morton County, Kansas, August 5, 1911 (F. X. Williams); 8 males, Stanton County, Kansas, July 30, 1911 (F. X. Williams); 2 males, Hamilton County, Kansas, July (S. J. Hunter); male, Benkelman, Nebraska, October 5 (Lantz); male, Mitchell, Nebraska, August 3, 1914 (L. M. Gates); male, Jacksonville, Texas, August 7, 1906 (F. C. Bishopp); male, Palestine, Texas, August 10, 1906 (F. C. Bishopp); male, Overton, Texas, August 22, 1907 (W. W. Yothers); in collections of University of Kansas, Kansas Agricultural College, University of Nebraska, University of Montana, U. S. National Museum, and the author. (Fig. 9.)

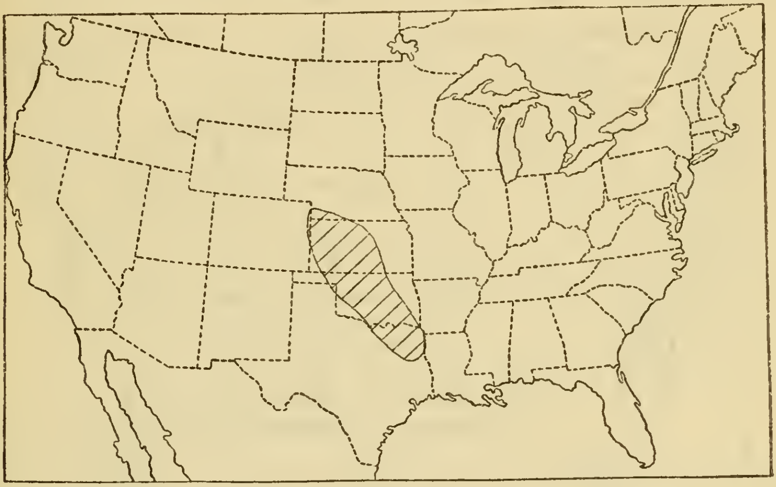

FIG. 9.—DISTRIBUTION OF DASYMUTILLA MYRICE, NEW SPECIES

Myrice is very closely related to *zelaya* Blake. The principal difference between the two is the presence of yellow pubescence on the vertex, pronotum, mesonotum, and scutellum. The genitalia of this species are identical with those of *zelaya* and are therefore not figured. This species has been identified as *ochracea* (Blake) in collections but is not that species. The type of this species has been compared with that of Blake's species.

35. DASYMUTILLA COCCINEOHIRTA (Blake)

Plate 2, fig. 11

Mutilla (*Sphaeropthtalma*) *coccineohirta* BLAKE, Trans. Amer. Ent. Soc., vol. 3, p. 235, 1871, male, female.

Mutilla ochracea BLAKE, Trans. Amer. Ent. Soc., vol. 7, p. 247, 1879, male.—DALLE TORRE, Cat. Hymen., vol. 8, p. 68, 1897, male.—FOX, Trans. Amer. Ent. Soc., vol. 25, p. 243, 1899, male (in part).—MELANDER, Trans. Amer. Ent. Soc., vol. 29, p. 301, 1903.

Sphaerophthalma venifica BLAKE, Trans. Amer. Soc., vol. 13, p. 210, 1886, female.

Sphaerophthalma coccineohirta BLAKE, Trans. Amer. Ent. Soc., vol. 13, p. 221, 1886, male, female.

Sphaerophthalma ochracea BLAKE, Trans. Amer. Ent. Soc., vol. 13, p. 228, 1886, male.

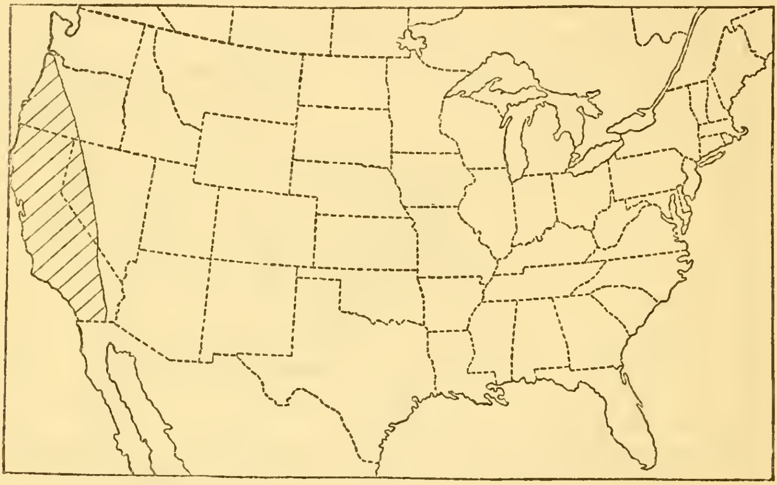

FIG. 10.—DISTRIBUTION OF DASYMUTILLA COCCINEOHIRTA (BLAKE)

Mutilla coccineohirta DALLE TORRE, Cat. Hymen., vol. 8, p. 25, 1897, male, female.—FOX, Trans. Amer. Ent. Soc., vol. 25, p. 242, 1899, male.

Mutilla venifica, DALLE TORRE, Cat. Hymen., vol. 8, p. 95, 1897, female.—Fox, Trans. Amer. Ent. Soc., vol. 25, p. 247, 1899, female.

Mutilla progne FOX, Trans. Amer. Ent. Soc., vol. 25, p. 247, 1899, female.

Ephuta (*Ephuta*) *coccineohirta* ANDRÉ, Gen. Ins., vol. 1, fasc. 11, p. 58, 1903, male, female.

Ephuta (*Ephuta*) *ochracea* ANDRÉ, Gen. Ins., vol. 1, fasc. 11, p. 62, 1903, male.

Ephuta (*Ephuta*) *progne* ANDRÉ, Gen. Ins., vol. 1, fasc. 11, p. 63, 1903, female.

Ephuta (*Ephuta*) *venifica* ANDRÉ, Gen. Ins., vol. 1, fasc. 11, p. 64, 1903, female.

Dasymutilla aletina COCKERELL, Entomologist, vol. 48, p. 249, 1915, male.

Type.—Male, California, in collection of American Entomological Society of Philadelphia. The types of *ochracea*, *venifica*, and *progne* are in the collection of the American Entomological Society of Philadelphia. The type of *aletina* is in the United States National Museum.

Plesiotype.—Male, Riverton, California, August 6, 1916 (L. Bruner), in collection of University of Nebraska.

Distribution.—California, Nevada, Oregon, Idaho. (Fig. 10.)

SPECIMENS EXAMINED

CALIFORNIA: Female, La Jolla, San Diego County, August 28, 1917 (H. Klotz); female, San Bernardino County; 2 males, Saugaus, Los Angeles County, August 18, 1917 (J. Bequaert); female, Fillmore, November 2, 1915; female, Pasadena; male, female, Los Angeles County; female, Los Angeles County, September; 2 males, mountains near Claremont (Baker); female, mountains near Claremont; male, Santa Barbara County; male, Lompoc, September 9, 1908 (J. C. Bradley); male, Delano, June, 1921 (H. M. Jeancon); 2 males, female, Kettleman plain, Fresno County, June 4, 1907 (J. C. Bradley); female, Los Gatos Canyon, Fresno County, June 6–8, 1907 (J. C. Bradley); male, Fresno, June 23, 1923 (M. E. Phillips); female, Fresno, September 12, 1923; male, Fresno, October 20, 1922; female, Carmel, Monterey County, May 21, 1916 (L. S. Slevin); male, Carmel, August 15, 1922 (L. S. Slevin); male, Carmel, 1922 (L. S. Slevin); female, Monterey County, August 29, 1922 (L. R. Dice); female, male, Pacific Grove, June, 1902 (H. Heath); female, Spreckels, September 20, 1904; male, Stanford University, October, 1905; female, Felton, May 20–26, 1907 (J. C. Bradley); female, San Francisco; 2 females, Sacramento County; male, Chico, August 11, 1912 (E. D. Ball); female, Sherwood, July 1, 1907; female, male, Towle, Placer County, August, 1912; 9 females, 5 males, Riverton, August 6, 1916 (L. Bruner); 2 females, 2 males, Keddie, May 7, 1918; female, Siskiyou County; female, Sierra Nevada; 9 females, 4 males.

IDAHO: Female, Boise, August 30, 1902 (H. E. Burke).

NEVADA: Female.

OREGON: Female, Corvallis, June 11, 1900; female, Corvallis, August 12, 1900; female, Laidlaw, August 6, 1906 (Scoggin); female, Ontario, August 17, 1905 (Mallett); female, Ashland (H. A. Scullen).

This species is rather distantly related to the two preceding species. The genitalia of the males are somewhat similar in type to those of *zelaya* but differ considerably as will be seen from the figure. Both the males and females vary in color from yellow to red. The males vary in length from 7 mm. to 14 mm., and the females vary likewise from 6.5 mm. to 11 mm. A male and female of this species were taken in copula by Professor Lawrence Bruner at Riverton, California. The type specimens of both *venifica* Blake and *progne* Fox have been examined and found to be identical with the female taken at Riverton, California. An examination of the types of *ochracea* Blake and *aletina* Cockerell shows that they are the same as the male of this species. The male recorded from New Mexico by Melander (1903) is evidently not *coccineohirta* as it is extremely doubtful if the species is found that far east. The genitalia of the type of *coccineohirta* have been examined and found to be identical with those of the plesiotype which are figured.

36. DASYMUTILLA CLYTEMNESTRA (Fox)

Mutilla clytemnestra Fox, Trans. Amer. Ent. Soc., vol. 25, p. 246, 1899, female.

Ephuta (*Ephuta*) *clytemnestra* ANDRÉ, Gen. Ins., vol. 1, fasc. 11, p. 58, 1903. female.

Type.—Female, Poway, California, in collection of Entomological Society of Philadelphia.

Distribution.—California.

SPECIMENS EXAMINED

CALIFORNIA: Female, Little Bear Valley, San Bernardino Mountains, San Bernardino County, July 7, 1917 (R. May); female, Claremont (Essig); female, Claremont, female, Los Angeles County, September; female, Tejunga, June 25–28, 1918 (C. B. Philip); female, Moorpark, January 2, 1916; female, Santa Paula.

This species is very closely related to the preceding one, the principal difference being in the color of the pubescence. *Coccineohirta* has the pubescence varying from light yellow to deep red, while *clytemnestra* has the pubescence almost pure white, and may prove to be only a variety of *coccineohirta.*

GROUP BIOCULATA

Females having the mandibles acute at the apex and a tooth on the inner margin, thus bidentate; the antennal scrobes usually not carinate above, but the carina more or less present in some species; postero-lateral angles of head not at all tuberculate; thorax long, subrectangular, the scutellar scale present, and a transverse, sinuate carina immediately anterior to the scutellar scale; pygidium longitudinally rugose; and the carina of the first abdominal sternite produced anteriorly into a prominent tooth. Males having the mandibles tridentate; antennal scrobes not at all or obscurely carinate above; tegulae glabrous, impunctate for the most part; the last abdominal tergite with an apical fringe of short, erect, black hairs, and the second abdominal sternite with a median pit densely filled with hairs (rudimentary or entirely absent in *bioculata* and *ursula*).

37. DASYMUTILLA BIOCULATA (Cresson)

Mutilla bioculata CRESSON, Proc. Ent. Soc. Phila., vol. 4. p. 431, 1865, male.—BLAKE, Trans. Amer. Ent. Soc., vol. 4, p. 73, 1872, male; Trans. Amer. Ent. Soc., vol. 7, p. 244, 1879, male.—DALLE TORRE, Cat. Hymen., vol. 8, p. 16, 1897, male.—FOX, Trans. Amer. Ent. Soc., vol. 25, p. 243, 1899, male.

Mutilla aegina Cresson, Proc. Ent. Soc. Phila., vol. 4, p. 435, 1865, female.—Blake, Trans. Amer. Ent. Soc., vol. 4, p. 73, 1872, female; Trans. Amer. Ent. Soc., vol. 7, p. 244, 1879, female.—Dalle Torre, Cat. Hymen., vol. 8, p. 6, 1897, female.—Fox, Trans. Amer. Ent. Soc., vol. 25, p. 238, 1899, female.—Melander, Trans. Amer. Ent. Soc., vol. 29, p. 297, 1903, female, pl. 4, fig. 13.

Mutilla (Sphaerophthalma) aegina Blake, Trans. Amer. Ent. Soc., vol. 3, p. 235, 1871, female.

Mutilla (Sphaerophthalma) bioculata Blake, Trans. Amer. Ent. Soc., vol. 3, p. 236, 1871, male.

Sphaerophthalma aegina Blake, Trans. Amer. Ent. Soc., vol. 13, p. 221, 1886, female.

Sphaerophthalma bioculata Blake, Trans. Amer. Ent. Soc., vol. 13, p. 224, 1886, male.

Ephuta (Ephuta) aegina André, Gen. Ins., vol. 1, fasc. 11, p. 57, 1903, female.

Ephuta (Ephuta) bioculata André, Gen. Ins., vol. 1, fasc. 11, p. 58, 1903, male.

Mutilla chlamydata Melander, Trans. Amer. Ent. Soc., vol. 29, p. 299, 1903, female.

Sphaerophthalma chlamydata Hart, Bull. Ill. Lab. Nat. Hist., vol. 7, pp. 254, 266, 1907, female.

Dasymutilla (Dasymutilla) chlamydata Bradley, Trans. Amer. Ent. Soc., vol. 42, p. 331, 1916, female.

Dasymutilla bioculata Washburn, 17th Rept. State Entomologist of Minnesota, p. 209, 1918, fig. 97, male.—Mickel, 19th Report State Entomologist of Minnesota, p. 103, 1923, male; Ent. News. vol. 35, pp. 236–242, 1924, male, female.—Chapman, Mickel, Parker, Miller, and Kelley, Ecology, vol. 7, pp. 420, 421, 423, 426, 1926, male, female.

Dasymutilla ferrugata Washburn, 17th Rept. State Entomologist of Minnesota, p. 209, 1918, fig. 98, female (not Fabricius).

Dasymutilla chlamydata Mickel, 19th Report State Entomologist of Minnesota, p. 103, 1923, female.

Type.—Male, Colorado Territory, in collection of American Entomological Society of Philadelphia. The type of *aegina* is in the collection of the American Entomological Society of Philadelphia; the type of *chlamydata* is in the collection of Washington State College, Pullman, Washington.

Distribution.—Illinois, Mississippi, Louisiana, Texas, Oklahoma, Kansas, Nebraska, Iowa, Minnesota, South Dakota, North Dakota, Montana, Manitoba, Alberta, Washington, Wyoming, Colorado, and New Mexico. (Fig. 11.)

SPECIMENS EXAMINED

Alberta, Canada: 3 females, 3 males, Medicine Hat, July 17, 1917 (Sladen); 5 females, Medicine Hat, July 23, 1919 (Sladen); 2 males, 9 females, Medicine Hat, August 20, 1916 (Sladen); female, Lethbridge, August 9, 1921 (H. L. Seamans); female, Lethbridge, August 18, 1922 (H. L. Seamans); 2 females, Lethbridge, August 22, 1923 (H. L. Seamans); female, Lethbridge, September (J. Harms); male, July 15, 1922 (H. L. Seamans).

British Columbia, Canada: Female, Oliver, July 17, 1923 (P. N. Vroom); 3 females, Oliver, July 24, 1923 (E. R. Buckell).

Colorado: Male, Fort Collins, June 6, 1902 (L. A. Titus); male, Fort Collins, July 4; male, Fort Collins, August 11, 1898; female, Fort Collins, August 23, 1899; female, Denver, September 7, 1901; male, Clear Creek, July 12; male, Clear Creek, August 27, 1902 (Oslar); male, Kenosha Pass, August (Oslar); male, Platte Cañon, July (Oslar); male, Las Animas, July 17, 1901; 2 females, Lamar, July 10, 1899; 3 males, Rocky Ford, July 4, 1904; male, Rocky Ford, July 31, 1921 (C. E. Mickel); male, Trinidad, July 13, 1899; 2 males, female, Salida, July 20 (Lantz); male, Poncho Springs, July 14, 1898; 2 females, Buenavista, July 1–6, 1896 (H. F. Wickham); 5 males, female, Ridgway, July (Oslar); 20 males, Silverton, August (Oslar); 9 males, 4 females.

Iowa: Female, Eastport (B. Shimek); female, Ames, June 29, 1893 (F. A. S.); 4 females, Ames.

Illinois: Female, Havana, 1894; 3 females, Meredosia, 1898 (F. M. McE.); female, Meredosia, 1898.

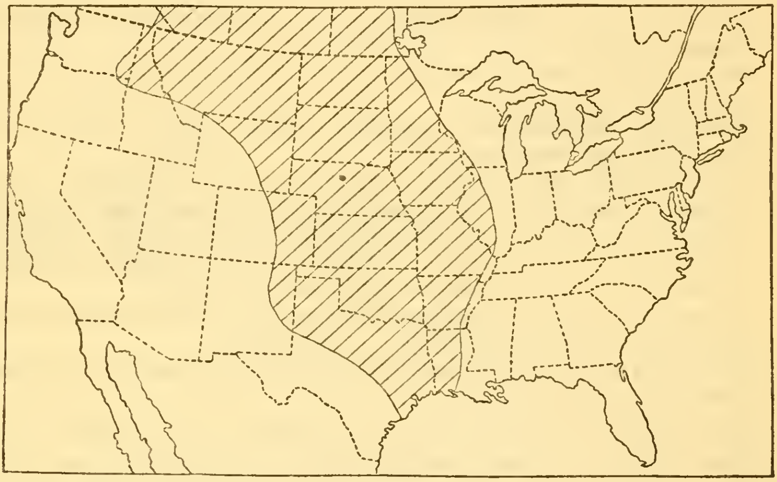

Fig. 11.—Distribution of Dasymutilla bioculata (Cresson)

Kansas: 3 females, Douglas County, July 25, 1919 (W. E. Hoffmann); female, Douglas County; female, Riley County, May 4 (Popenoe); female, Riley County, June 26 (G. A. Dean); female, Riley County, June 27 (F. Marlatt); 3 males, Riley County, July 10 (Popenoe); female, Riley County, July 11 (Popenoe); female, Riley County, July 12 (Popenoe); female, Riley County, July 16 (Popenoe); 4 females, Riley County, July 17 (Popenoe); 5 females, Riley County, July 19 (Popenoe); 18 females, Riley County, July 21 (Popenoe); female, Riley County, July 21 (G. A. Dean); 3 females, Riley County, July 22 (Popenoe); 2 females, Riley County, July 22 (J. B. Norton); female, Riley County, July 23 (G. A. Dean); 2 females, Riley County, July 24 (G. A. Dean); 6 females, Riley County, July 25 (G. A. Dean); female, Riley County, July 26 (G. A. Dean); female, Riley County, July 30 (G. A. Dean); 3 females, Riley County, August 5 (G. A. Dean); female, Riley County, August 7 (Popenoe); female, Riley County, August 8 (J. B. Norton); female, Riley County, August 9 (Popenoe); 58 females, Riley County, August 12 (G. A. Dean); 2 females, Riley County, August

18 (Popenoe); female, Riley County, August 22 (Popenoe); 2 females, 3 males, Riley County, September 1 (Popenoe); 3 males, Riley County, September 2 (Popenoe); female, 3 males, Riley County, September 4 (Popenoe); female, Wichita, May 5, 1889; 9 females, Medora, August 28, 1925 (W. J. Brown); 12 females, Medora, September 21, 1913 (Horton); female, Medora, September 27, 1921; female, Medora (W. Knaus); male, Nickerson, June 29, 1914; female, Nickerson, July 5, 1914; female, Mitchell County, August 25; 2 females, male, Rooks County, August 9, 1912 (F. X. Williams); female, Phillips County, August 30, 1912 (F. X. Williams); 6 males, Meade County, July 10, 1911 (F. X. Williams); 6 females, Graham County, August 16, 1912 (F. X. Williams); male, Gray County, July 9–15, 1917; male, Trego County; female, Graham County, August 16, 1912 (F. X. Williams); 3 males, Decatur County (F. X. Williams); 8 males, Morton County, June, 1902 (F. H. Snow); 2 males, Morton County (F. H. Snow); 7 males, Wallace County, July, 1885; 2 males, Cheyenne County (F. X. Williams); 2 males (Snow); 8 females (T. B. A.).

LOUISIANA: Female, Cameron, June 24, 1905.

MANITOBA, CANADA: Female, Winnipeg, June 26, 1900; male, Aweme, July 5, 1920 (P. N. Vroom); female, Aweme, July 13, 1904 (J. Fletcher); female. Aweme, July 21, 1914 (N. Criddle); male, Aweme, July 22, 1912 (E. Criddle); male, Aweme, July 27, 1908; female, Aweme, July 28, 1920 (H. A. Robertson); female, Aweme, July 29, 1914 (N. Criddle); female, Aweme, August 4, 1920 (N. Criddle); female, Aweme, August 4, 1920 (P. N. Vroom); female, Aweme, August 5, 1920 (P. N. Vroom); female, Aweme, August 12, 1920 (N. Criddle); female, Aweme, August 19, 1913 (N. Criddle); female, Aweme, August 22, 1905 (J. Fletcher); female, Aweme, September 30, 1913 (N. Criddle); 3 males, Treesbank, July 20, 1910 (J. B. Wallis); female, Treesbank, July 21, 1910 (J. B. Wallis).

MINNESOTA: Male, Lake City, July 7, 1921 (A. A. Nichol); female, LeSeuer County, July 17, 1923 (W. E. Hoffmann); female, LeSeuer County, July 18 (W. E. Hoffmann); female, LeSeuer County, August 10, 1923 (W. E. Hoffmann); 4 females, Castle Rock, August 20, 1922 (F. C. Fletcher); female, Castle Rock, August 30, 1925 (F. C. Fletcher); female, Castle Rock, August 31, 1924 (F. C. Fletcher); 31 females, 7 males, Jordan, July 13, 1923 (A. T. Hertig); 2 females, 2 males, Jordan, July 13, 1923 (C. E. Mickel); 2 females, Jordan, July 13, 1923 (H. H. Knight); 5 females, Jordan, August 1, 1922 (A. T. Hertig); female, male, Barden sand dunes, Scott County, July 29, 1923 (C. E. Mickel); 2 females, male, Barden sand dunes, Scott County, July 29, 1923 (R. W. Dawson); 6 females, Scott County, August 25, 1922 (A. A. Nichol); 9 females, Gray Cloud Island, August 5, 1896; 2 females, Gray Cloud Island, August 20, 1898; 2 females, Gray Cloud Island, September 3, 1899; male, Fort Snelling, June 28. 1923 (H. H. Knight); female, Fort Snelling, July 28, 1922 (A. A. Nichol); female, male, Hennepin County; female, Crystal Lake, June 30, 1921 (H. H. Knight); female, Ramsey County, May 7; female Hennepin County; 30 females, 18 males, Anoka County, June 30, 1923 (H. H. Knight); female, male, Anoka County, June 30, 1923 (R. W. Dawson); 6 males, female, Fridley sand dunes, Anoka County, June 3, 1923 (W. E. Hoffmann); female, male, Fridley sand dunes, Anoka County, June 30, 1923 (C. E. Mickel); 4 females, male, Fridley sand dunes, Anoka County, July 3, 1923 (C. E. Mickel); female, 4 males, Fridley sand dunes, Anoka County, July 11, 1924 (R. W. Dawson); 13 females, 13 males, Fridley sand dunes, Anoka County, July 14, 1922 (A. A. Nichol); female, male, Fridley sand dunes, Anoka County, July 14, 1925 (C. B. Philip); 3 males, 2 females, Fridley sand dunes, Anoka County, July 14, 1925 (F. C. Hottes); 2 males, Fridley sand dunes, Anoka County, July 17, 1923 (C. E. Mickel); 61 females, male, Fridley sand dunes, Anoka County, July 21, 1922 (C. E. Mickel); 12 females, 5 males, Fridley sand dunes, Anoka County, July 24. 1922 (C. E. Mickel); 17 females, male, Fridley sand dunes, Anoka County, July 24, 1922 (Paul Gilmer); 47 females, 2 males, Fridley sand dunes, Anoka County, July 24, 1923 (C. E. Mickel); 2 females, male, Fridley sand dunes, Anoka County, July 26, 1923 (C. E. Mickel); 6 females, 6 males, Fridley sand dunes, Anoka County, July 26, 1923 (R. W. Dawson); 25 females, 29 males, Fridley sand dunes, Anoka County, July 28, 1922 (Paul Gilmer); 120 females, 60 males, Fridley sand dunes, Anoka County, July 28, 1922 (C. E. Mickel); 7 males, female, Fridley sand dunes, Anoka County, August 3, 1924 (R. W. Dawson); 5 females, Fridley sand dunes, Anoka County, August 8, 1922 (A. T. Hertig); 16 females, 3 males, Fridley sand dunes, Anoka County, August 8, 1922 (C. W. Johnson); female, Fridley sand dunes, Anoka County, August 10, 1924 (R. W. Dawson); female, Fridley sand dunes, Anoka County, September 13, 1925 (C. B. Philip).

Mississippi: Female, Agricultural College, May 22 (A. T. Wallace).

Montana: Male, Miles City, August 29, 1915; female, Custer, August 10, 1912; male, Broadwater County, July 28, 1920 (A. A. Nichol); male, Billings, July 20, 1904; female, Columbus, September 7, 1905; male, Missoula, July 16, 1904.

Nebraska: Male, Omaha, July 12, 1913 (L. T. Williams); male, Omaha, July 14, 1914 (L. T. Williams); male, Omaha, August 3, 1914 (L. T. Williams); male, Omaha, August 5, 1913 (L. T. Williams); male, Omaha, August 17, 1913 (L. T. Williams); female, Omaha, September 6, 1913 (L. T. Williams); male, Omaha; female, male, Louisville, July 5, 1915 (E. G. Anderson); male, Louisville, July 30, 1914 (E. G. Anderson); female, Louisville, August 1, 1914 (S. H. Emerson); female, August 2, 1914 (E. G. Anderson); male, Meadow, July 3, 1915 (E. G. Anderson); male, South Bend, June 30, 1915 (E. G. Anderson); male, South Bend, July 2, 1915 (E. G. Anderson); 6 males, Lincoln, July 4, 1920 (R. W. Dawson); 4 females, Lincoln, July 11, 1920 (C. E. Mickel); 2 females, Lincoln, July 18, 1920 (R. W. Dawson); female, Lincoln (Shimek); male, South Sioux City, July 6, 1912 (L. T. Williams); female, South Sioux City, July 29, 1912 (L. T. Williams); male, West Point, June 24; 2 males, West Point, June, 1887; 3 females, male, West Point; female, Halsey, July 9, 1912 (J. T. Zimmer); female, Halsey, July 26, 1912 (J. T. Zimmer); female, Halsey, August 7, 1912 (J. T. Zimmer); female, male, Halsey, August 9, 1925 (R. W. Dawson); 2 females, Halsey, August 11, 1925 (R. W. Dawson); 17 females, 2 males, Halsey, August 13, 1920 (C. B. Philip); female, Halsey, August 13, 1925 (R. W. Dawson); 3 females, Halsey, August 14, 1920 (C. B. Philip); female, Halsey, August 14, 1925 (R. W. Dawson); 4 females, Halsey, August 15, 1925 (R. W. Dawson); 3 females, Halsey, August 16, 1925 (R. W. Dawson); female, Halsey, August 19, 1920 (C. B. Philip); 3 females, Halsey, August 28, 1911 (J. T. Zimmer); 5 females, Halsey, August 29, 1924 (R. W. Dawson); female, Halsey, August 30, 1924 (R. W. Dawson); female, Halsey, August 31, 1911 (J. T. Zimmer); female, Halsey, August 31, 1924 (R. W. Dawson); 4 females, Halsey, September 1, 1924 (R. W. Dawson); 4 females, Halsey, September 3, 1924 (R. W. Dawson); 7 females, Sand Hills, September;

2 males, Haigler, July 6, 1911 (J. T. Zimmer); female, Haigler, August 10, 1901 (L. Bruner); female, Haigler, August 14, 1909 (C. H. Gable); female, Sidney, August 12, 1901 (M. A. Carriker, Jr.); male, Kimball, August 5, 1899; female, Bridgeport, July 10, 1912 (L. M. Gates); 10 females, Scottsbluff, August 5, 1923 (Leonard Worley); female, Mitchell, July 9, 1914 (L. M. Gates); female, Mitchell, July 11, 1916 (C. E. Mickel); male, Mitchell, July 13, 1916 (C. E. Mickel); female, Mitchell, July 20, 1916 (C. E. Mickel); female, Mitchell, July 29, 1912 (L. M. Gates); female, Mitchell, August 4, 1915 (E. M. Partridge); female, Mitchell, August 8, 1915 (E. M. Partridge); female, Mitchell, August 11, 1915 (E. M. Partridge); 2 females, Mitchell, August 12, 1915 (E. M. Partridge); female, Mitchell, August 15, 1913 (L. M. Gates); female, male, Mitchell, August 20, 1915 (E. M. Partridge); female, Mitchell, August 21, 1915 (E. M. Partridge); 2 females, Mitchell, August 26, 1915 (E. M. Partridge); male, Agate, August 20, 1906 (L. Bruner); male, Harrison, August 9, 1908 (C. H. Gable); male, Harrison, August 12, 1912 (E. J. Taylor); male, Harrison, August 12, 1912 (R. W. Dawson); female, Harrison, August 15, 1908 (C. H. Gable); male, Harrison, August 20, 1912 (R. W. Dawson); female, Glen, July 12, 1910 (L. Bruner); female, Glen, August 5, 1905; female, Glen, August 8, 1905; female, Glen, August 9, 1905; female, Glen, August 10, 1905; 5 females, male, Glen, 1905; male, Glen, August 13, 1906 (M. H. Swenk); female, Glen, August 13, 1906 (H. S. Smith); female, Glen, August 15, 1905; female, Glen, August, 1905; 2 females, Monroe Canyon, Sioux County, July 28, 1913 (R. W. Dawson); female, Monroe Canyon, Sioux County, August 2, 1913 (E. J. Taylor); male, Monroe Canyon, Sioux County, August 6, 1908 (C. H. Gable); male, Monroe Canyon, Sioux County, August 7, 1908 (R. W. Dawson); female, Monroe Canyon, Sioux County, August 13, 1912 (R. W. Dawson); 5 females, 3 males, Pine Ridge, July; female, Sioux County; female, northwest Nebraska.

NEW MEXICO: Male, Albuquerque, August, 1894 (Snow).

NORTH DAKOTA: 3 females, Sheldon, August 10, 1919 (O. A. Stevens); 2 females, Sheldon, August 21, 1918 (O. A. Stevens); 3 females, Sheldon, August 28, 1920 (O. A. Stevens); female, Devil's Lake, August 13, 1920 (T. H. Hubbell); 4 females, Steele, August 18, 1922 (O. A. Stevens); female, Mandan, August 9, 1922 (R. L. Webster); female, Mandan, August 11, 1922 (R. L. Webster); female, Moffit, August 22, 1922 (O. A. Stevens); 2 females, Cannon Ball, August 20, 1922 (O. A. Stevens); 3 females, 6 males, Medora, August 3, 1922 (O. A. Stevens); female, Dickinson (C. N. Ainslie); female, Beach, August 23, 1923 (C. N. Ainslie); 4 females, male, Beach (C. N. Ainslie); 5 males, northeast North Dakota (C. N. Ainslie); female, Amidon, Slope County, August 24, 1920 (T. H. Hubbell); male, Buford, Williams County, July 23, 1920 (A. L. Olson); female.

OKLAHOMA: 2 females, Payne County, June 20, 1925 (W. J. Brown).

SOUTH DAKOTA: Female, Martin, September 3, 1923 (H. C. Severin); female, Martin, September 12, 1925 (H. C. Severin); female, 3 males, Pierre; female, Fort Pierre, August 11, 1924; female, Creston, August 4, 1924; male, Redig, July 30, 1924; male, Hot Springs, July 11, 1924; female, Whitewood, July 23, 1924; 10 females, 2 males, Buffalo, July 31, 1924; 2 females, Buffalo, August 25, 1924 (H. C. Severin); female, Buffalo, August 26, 1924 (H. C. Severin); 2 females, Pineridge, September 2, 1924 (H. C. Severin); male, Camp Crook, August 1, 1924.

TEXAS: Male, Colorado County, June 6, 1922 (Grace Olive Wiley); male, Dallas, October 9, 1905 (F. C. Bishopp); 2 females, Mineola, July 19, 1906 (Bishopp and Jones); 3 males, Wharton, June 24, 1917; male, Wharton, September 17 (A. McLaughlin); male, Richmond, May 29, 1918 (J. C. Bradley); 4 males.

WASHINGTON: Female, Wawawai, August 30, 1908 (W. M. Mann).

WYOMING: 2 males, Worland, August 1, 1911 (L. Bruner).

This species is parasitic on both *Bembix pruinosa* Fox and *Microbembex monodonta* Say. The host relationships and the variation in size have been discussed by the author (1924).

The pubescence of the females varies in color from bright ferruginous to pale yellow. In some male specimens the vertex, pronotum, mesonotum, scutellum, and postscutellum are clothed with erect, ferruginous to yellow pubescence, but in others the vertex and pronotum are clothed with black pubescence while the ferruginous to yellow pubescence is confined to the mesonotum, scutellum, and postscutellum. The second abdominal sternite of the males appears to lack the median pit filled with hairs which is present in related species. This character is practically obsolete in *bioculata*, although there is a faint indication of this pit in nearly all specimens. It is so faint, however, that it is only noticed in careful observations and is a mere rudimentary impression, not to be described as a pit. *Bioculata* is very closely related to *lepeletierii*. The genitalia of the males of both are identical and since those of *lepeletierii* are figured it has not been thought necessary to figure those of *bioculata*. The females placed here have been compared with the type of *aegina* and found to be the same.

38. DASYMUTILLA LEPELETIERII (Fox)

Plate 2, fig. 12

Mutilla fenestrata LEPELETIER, Hist. Nat. Insectes, Hymen., vol. 3, p. 627, 1845, male.—BLAKE, Trans, Amer. Ent. Soc., vol. 7, p. 244, 1879, male.—DALLE TORRE, Cat. Hymen., vol. 8, p. 40, 1897, male.

Mutilla (Sphaerophthalma) fenestrata BLAKE, Trans. Amer. Ent. Soc., vol. 3, p. 238, 1871, male.

Mutilla (Sphaerophthalma) ferrugata BLAKE, Trans. Amer. Ent. Soc., vol. 3, p. 246, 1871, female.

Mutilla ferrugata BLAKE, Trans. Amer. Ent. Soc., vol. 7, p. 245, 1879, female.—DALLE TORRE, Cat. Hymen., vol. 8, p. 40, 1897, female.—FOX, Trans. Amer. Ent. Soc., vol. 25, p. 239, 1899, female.—MELANDER, Trans. Amer. Ent. Soc., vol. 29, p. 297, 1903, male, female.

Sphaerophthalma fenestrata BLAKE, Trans. Amer. Ent. Soc., vol. 13, p. 228, 1886, male.

Sphaerophthalma ferrugata BLAKE, Trans. Amer. Ent. Soc., vol. 13, p. 239, 1886, female.

Mutilla lepeletierii FOX, Trans. Amer. Ent. Soc., vol. 25, p. 244, 1899, male (part).

Ephuta (*Ephuta*) *fenestrata* ANDRÉ, Gen. Ins., vol. 1, fasc. 11, p. 59, 1903, male.

Ephuta (*Ephuta*) *ferrugata* ANDRÉ, Gen. Ins., vol. 1, fasc. 11, p. 60, 1903, female.

Mutilla vierecki ROHWER, Proc. Ent. Soc. Wash., vol. 12, p. 49, 1910, female.

Ephuta antiguensis ZAVATTARI, Ann. Mus. Zool. R. Uni. Napoli, new ser., vol. 3, no. 9, p. 14, 1910, female (part).

Dasymutilla ferrugata var. *balabetei* ROHWER, Proc. U. S. Nat Mus., vol. 41, p. 456, 1912, female.

Dasymutilla georgiana ROHWER, Proc. U. S. Nat. Mus., vol. 41, p. 456, 1912, female.—BANKS, Ann. Ent. Soc. Amer., vol. 14, p. 25, 1921, female.

Dasymutilla plesia ROHWER, Proc. U. S. Nat. Mus., vol. 41, p. 456, 1912, female.—BANKS, Ann. Ent. Soc. Amer., vol. 14, p. 26, 1921, female.

Dasymutilla (*Dasymutilla*) *ferrugata* BRADLEY, Trans. Amer. Ent. Soc., vol. 42, p. 327, 1916, female.

Dasymutilla (*Dasymutilla*) *lepeletierii* BRADLEY, Trans. Amer. Ent. Soc., vol. 42, p. 328, 1916, male (part).

Dasymutilla ferrugata ROHWER, Hymen of Conn., Bull. 22, Conn. Geol. Nat. Hist. Survey, p. 624, 1926, female.—BANKS, Ann. Ent. Soc. Amer., vol. 14, p. 25, 1921, female.—RAU, Trans. Acad. Sci. St. Louis, vol. 24, no. 7, p. 6, ?1922, female.

Dasymutilla fenestrata ROHWER, Hymen. of Conn., Bull. 22, Conn. Geol. Nat. Hist. Survey, p. 624, 1916, male.

Dasymutilla vierecki ROHWER, Hymen. of Conn.,. Bull. 22, Conn. Geol. Nat. Hist. Survey, p. 625, 1916, female.—BANKS, Ann. Ent. Soc. Amer., vol. 14, p. 26, 1921, female.

Type.—Male, Pennsylvania.

Through the kindness of Dr. L. O. Howard and Mr. S. A. Rohwer I have had the opportunity of sending six species of male Mutillids to the Paris Museum for comparison with the type of *fenestrata*, which it was supposed would be located there. Monsieur P. Lesne replied, however, that the type of this species belonged to the Serville collection, and that on the death of this entomologist the collection was sold and dispersed. The fate of the Mutillidae in that collection could not be learned.

The type of *fenestrata* is then, apparently lost and it seems advisable to erect a neotype. While the original *fenestrata* can not be definitely identified with the description given by Lepeletier the species under consideration answers the requirements nearer than any other and the neotype is therefore selected from it. It may be added that all the series of determined *fenestrata* that have come under my observation have been composites of from two to five species. The name *fenestrata* is a homonym as pointed out by Fox (1899) and must be replaced by Fox's *lepeletierii*.

Neotype.—Male, Washington, D. C., June, 1899, in collection of United States National Museum.

The description of the neotype is as follows:

Male.—Black, except the second abdominal segment entirely ferruginous, and the first abdominal segment dark mahogany red, clothed with sparse, erect, black pubescence, except a pair of obscurely defined, subapical areas of the second abdominal tergite with yellowish pubescence. Length, 13 mm.

Head black, sparsely clothed with long, erect, black pubescence; mandibles tridentate at the apex; clypeus bidentate medially on the cephalic margin; disk of clypeus moderately, shallowly and confluently punctate; scape bicarinate beneath, shallowly, confluently punctate and sparsely clothed with long, black pubescence; first segment of flagellum five-sixths as long as the second; antennal scrobes not distinctly carinate above; front with close, moderate, shallow punctures; vertex and genae with separated, shallow, moderate punctures; relative widths of head and thorax, 7–9.

Thorax black, sparsely clothed with long, erect, black pubescence; pronotum distinctly emarginate medially on the cephalic margin, the cephalic face of the emargination glabrous, impunctate; pronotum, mesonotum, scutellum and metanotum with coarse, deep, confluent punctures throughout; propleura coarsely, confluently punctate; mesopleura deeply, coarsely foveolate; metapleura coarsely, confluently punctate on the ventral third, glabrous, impunctate on the dorsal two-thirds; sides of propodeum with the narrow anterior margin glabrous, impunctate, the remainder very coarsely foveolate; posterior face and dorsum of propodeum very coarsely foveolate, anterior half of tegulae setigerously punctate, the posterior half glabrous, impunctate.

Abdomen, except first and second segments, black; first tergite dark mahogany red, only very slightly constricted subapically, with coarse, close, more or less confluent punctures, the latter larger, and separated on the disk, sparsely clothed throughout with long, erect, black pubescence; second tergite ferruginous, with moderate, elongate, close but separated punctures throughout, sparsely clothed with long, erect, black pubescence, except a pair of large, subapical areas with the pubescence yellow, and a thick fringe of long, black pubescence; tergites 3–6 with very small, distinct punctures, sparsely clothed with long, erect, black pubescence and each with a thick fringe of long, black pubescence; basal third of ultimate tergite with very small, distinct punctures and with long, erect, black pubescence, the pygidial area glabrous, impunctate, and narrow apical margin of ultimate tergite with a distinct fringe of black pubescence; first sternite black, with a distinct, median longitudinal carina, not produced posteriorly, and with large, close punctures, sparsely clothed with long, erect, black pubescence; second sternite ferruginous with a median, longitudinal, ovate pit, closely filled with hairs, with large, close, distinct punctures throughout, sparsely clothed with long, erect, black pubescence and with an apical fringe of long, black pubescence; sternites 3–6 with the subapical margin distinctly and closely punctate, and each with an apical fringe of long, black pubescence; ultimate sternite with distinct punctures, and sparse, erect, black pubescence.

Legs very dark mahogany red, sparsely clothed with long, black pubescence.

Wings dark fuliginous; cell 2nd R_1+R_2 broadly truncate at the apex; cell R_4 almost obsolete; vein M_{3+4} received by cell R_5 at one-third the distance from the base to the apex; veins r–m and R_5 separated on vein r.

The female of *lepeletierii* has been identified as *ferrugata* Fabricius by American entomologists. Fabricius states in the original description of *ferrugata* "Abdominis segmentum primum margine nigro, reliquis margine cinereo. Pedes nigri, femoribus ferrugineis." *Mutilla ferrugata* Blake and of subsequent authors does not agree with this description, the apical margin of the second segment being broadly black, and the femora very dark.

Through the courtesy of Dr. Walther Horn of Berlin I have been fortunate enough to secure the loan of two specimens from the Kiel Museum which apparently are the specimens from which Fabricius drew up his description. These specimens agree with Fabricius' description in every detail. They do not belong to the genus *Dasymutilla* but are representatives of Ashmead's genus *Timulla.* The *ferrugata* of Fabricius, then, should be removed to the genus *Timulla.* The evidence is fairly conclusive that *ferrugata* Blake and of subsequent authors is the female of *lepeletierii*, so it is not necessary to propose a new name.

Melander (1903) united *lepeletierii* and *ferrugata* Blake as the male and female of the same species, but this was not accepted by later workers. In the material before me there is a male and female taken at Spring Creek, Decatur County, Georgia, May 18–21, 1916, by J. Chester Bradley with the following note: "Taken together but not in actual copulation." The female is very closely related to the female of *bioculata.* The male is also very closely related to the male of *bioculata.* The geographical ranges of the females and males placed here are the same. All of the evidence taken together seems to indicate pretty clearly that the female *ferrugata* Blake and the male *lepeletierii* are one and the same species and this view is indicated by the above synonymy.

Bradley (1916) has pointed out many of the variations that are present in female specimens of this species. The females examined by the writer vary in length from 9 to 18 mm. The legs vary in color from a dark mahogany red to rufous; I have seen none with the legs actually black. Most specimens have the second abdominal tergite fringed with black pubescence interrupted medially by a small spot of silvery pubescence; some specimens, however, have the fringe entirely black without the median pale spot, and still others from the Southern States have the black pubescence extending on to the third abdominal tergite. Such specimens also show a tendency for the pubescence on the sides of the thorax to be black. For the present there seems to be no advantage in designating these differences with varietal names. The males vary in length from 8.5 mm. to 15 mm. Previous authors have said that this species occurs from the Atlantic States to California, and from the Atlantic States to Arizona. In the many thousands of specimens examined by the writer I have not seen one from farther west than eastern Texas. I have examined the types of *ferrugata* var. *balabetei* Rohwer, *georgiana* Rohwer, *plesia* Rohwer, and *vierecki* Rohwer and agree with Bradley (1916) that they are identical with the female of *lepeletierii.* Thanks to Director Monticelli, of the Zoological Museum of the University of Naples, I have had the privilege of examining the two specimens from Texas determined by Zavattari (1910) as *Ephuta antiguensis* Fabricius. One of these proves to be a female specimen of *lepeletierii.*

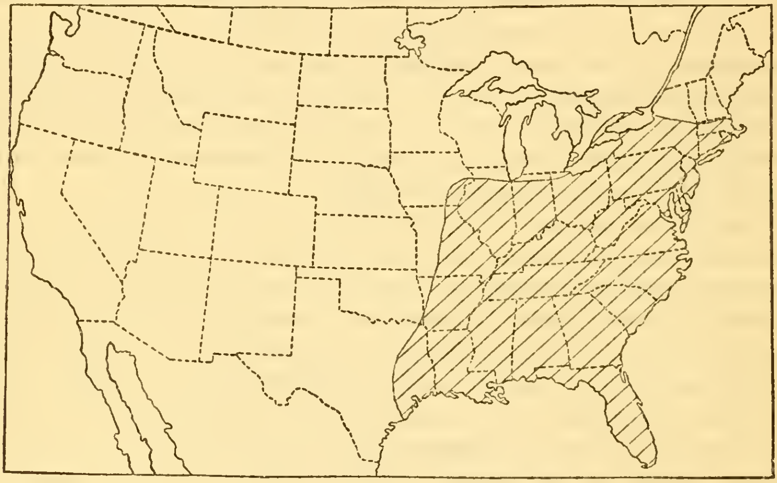

FIG. 12.—DISTRIBUTION OF DASYMUTILLA LEPELETIERII (FOX)

The species *lepeletierii* is very closely related to *bioculata*, the latter replacing it in the Middle Western States. Female specimens of *lepeletierii* usually have the third tergite silvery pubescent, but occasional large specimens from the Southern States have this tergite more or less black; on the other hand, the females of *bioculata* usually have the third tergite black, although occasional small specimens have the third tergite silvery pubescent. This should be kept in mind when using the key to separate the two species.

The types of *ferrugata* var. *balabetei*, *georgiana*, *plesia*, and *vierecki* are in the United States National Museum.

Distribution.—Massachusetts, Connecticut, New York, Pennsylvania, New Jersey, Maryland, District of Columbia, Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, Tennessee, Ohio, Ontario, Indiana, Illinois, Iowa, Arkansas, Mississippi, Louisiana, and Texas. (Fig. 12.)

SPECIMENS EXAMINED

Alabama: 4 males, 4 females, Thomasville, June 11, 1917 (H. H. Knight); female, Cowarts, August 1–3, 1916; male, female, Leroy, June 11, 1917.

Arkansas: Female, Pine Bluffs, September, 1890.

District of Columbia: 5 males, 2 females, Washington, June, 1899.

Florida: 2 females, Miami, November 8 (C. H. T. Townsend); 3 females, Miami; female, Marco, April 18, 1912; female, Marco, April 21, 1912; female, Fort Myers, April 25, 1912; female, Fort Myers, May 7, 1916 (J. C. Bradley); female, Long Boat Key, Sarasota, August 14, 1910 (J. C. Bradley); female, Lakeland, May 7, 1912; 8 females, Indian River; female, Sanford, April 30, 1908 (Van Duzee); female, Ocala, October 24, 1919; male, Gainesville, March 1, 1923; female, Gainesville, April 14, 1922 (T. P. Winter); male, Gainesville, May 5, 1922 (T. P. Winter); male, Gainesville, May 23, 1914; 2 females, May 23, 1921; female, Gainesville, November 2, 1918 (P. W. Fattig); female, Gainesville, 1921; male, Gainesville (J. R. W.); female, Lake City, female, Crestview, October 1–16, 1914; female, LaBelle, April 19 (D. M. Delong); female, LaBelle, April 20, 1921 (J. N. Knull); 2 females, LaBelle, April 27, 1912; female, Cedar Keys, June 2; male, Lanark, July 20, 1909; 2 males, female, Apalachicola, July 21–23, 1909 (J. C. Bradley); female.

Georgia: Male. St. Simon's Island, June 8, 1911; male, 3 females, Tybee Island, July 26, 1913; 2 females, Billy's Island, Okefenokee Swamp, June, 1912; 2 males, Billy's Island, Okefenokee Swamp, July, 1912; 2 males, 22 females, Billy's Island, Okefenokee Swamp, September 1–5, 1913; male, 2 females, Cannoche River, Groveland, July 28, 1913 (J. C. Bradley); female, Bainbridge, June, 1911 (J. C. Bradley); 3 males, female, Bainbridge, July 15–27, 1909 (J. C. Bradley); female, Bainbridge, September 17-October 19, 1916 (J. C. Bradley); female, Climax, July 28, 1906; 4 males, 4 females, Spring Creek, Decatur County, May 18–21, 1916 (J. C. Bradley); 5 females, Spring Creek, Decatur County, June 7–23, 1911 (J. C. Bradley); 5 males, 2 females, Spring Creek, Decatur County, July 16–29, 1912; 2 males, Spring Creek, Decatur County, August 26–28, 1913; female, Spring Creek, Decatur County, September 23-October 3, 1910 (J. C. Bradley); male, Spring Creek, Decatur County.

Illinois: Female, Peoria, July 7; female, Chicago, 1899; female.

Indiana: 2 males, Elkhart, June 7, 1899; male, Elkhart, July 5, 1899; male, 2 females, Elkhart, July 20, 1899; male, Elkhart, August 7, 1899; 2 males, 2 females, Hebron, July 17, 1925 (J. A. Harris, Jr.); female, Gary, July 18, 1925 (J. A. Harris, Jr.), 5 males.

Iowa: Female, Iowa City, August 4, 1898; female, Iowa City; female, Cedar Rapids, August, 1906 (N. K. Bigelow).

Louisiana: Female, Orange, September 30, 1906 (F. C. Bishopp); female, Gilliam, September 6, 1907 (F. C. Bishopp); male, Harahan, August 7, 1915 (Rehn and Hebard).

Maryland: Male. Chesapeake Beach, July 27, 1913 (Frederick Knab); male, Chesapeake Beach, July 27, 1913 (R. C. Shannon); female, Ocean City, July 9, 1905; female, Chestertown, August 9, 1900; female.

Massachusetts: Female, Woods Hole, July 18, 1922 (E. G. Anderson); female, Woods Hole, July 24, 1919; male, Woods Hole, July 24; male, Martha's Vineyard, July 22, 1910 (N. S. Easton); male, Cambridge; female, Hyannisport, August 10, 1899 (J. L. Zabriskie); 5 females, Springfield (Geo. Dimmock); male, Chicopee, July 10, 1896.

Mississippi: Male, Ocean Springs, June 5, 1915 (F. F. Bibby).

New Jersey: Female. Cape May, August 10, 1904; female, Stone Harbor, July 5, 1906; male, Corsons Inlet, July 26, 1923 (J. C. Bradley); female, Manumuskin, July 27, 1923 (J. C. Bradley); male, Manumuskin, June 23, 1902 (E. Daecke); female, Manumuskin, September 15, 1902 (E. Daecke); 5 males, Wilson's Landing, July 26, 1923 (J. C. Bradley); 2 males, female, Menanticho, July 27, 1923 (J. C. Bradley); male, Weymouth, July 20, 1904; 2 males, 2 females, Weymouth, July 25, 1923; 2 females, Weymouth, September 8, 1915; 4 females, 3 males, Iona, July 13, 1902 (E. Daecke); female, Iona, August 25, 1902 (E. Daecke); female, Clementon, June 25, 1899; female, Clementon, July 4, 1904; female, Clementon, July 9; female, Clementon, August 31, 1902; female, Clementon, September 6; 4 females, Westville, August 30; female, Camden county; male, Brown's Mills Jc., June 21, 1908; female, Brown's Mills Junction, June 24, 1906; female, Brown's Mills Junction, July 1, 1906; female, Brown's Mills "in the pines", August 3, 1919; male, White Horse, Burlington County, August 13, 1912; female, Cassville, August 17, 1910; female, Sandy Hook, October 12, 1910; 2 females, Milltown, July 7; female, Milltown, August 22; female, Little Ferry, August 15, 1909; female, Fort Lee District; female, Lakehurst, July 10, 1911 (W. T. Davis); 3 females, Lakehurst, August 15, 1912; female, Lakehurst, August 16, 1912; 3 females, Lakehurst, August 18, 1912; 3 females, Lakehurst, September 2; 4 females, Lakehurst, September 3; male, Lakehurst, September 4; 2 females, Lakehurst; 2 males, female, Lucaston, September 2, 1901; female, Lucaston, September 12, 1902 (E. Daecke); female, Da Costa, July 4 (H. Skinner); female, Da Costa, July 4, 1901; female, Da Costa, July 17, 1904; 5 females, male, Da Costa, July 19; 3 females, Da Costa, July 27, 1902 (E. Daecke); 2 males, Da Costa, July 28, 1902 (E. Daecke); female, Da Costa, July 28, 1902; male, Da Costa, July 28, 1923; 5 females, 3 males, Da Costa, August 3, 1902 (E. Daecke); 2 females, Midwood, August 18, 1910; 3 females, 2 males, Speedwell, August 12, 1902; female, Atsion, September 2, 1901; female, Rockaway, September 3, 1886; male, Big Timber Creek, September 22, 1901; female, Big Timber, September 25, 1901; male, Bergen County, July 4, 1918 (E. D. Quirsfeld).

New York: Female, Great Kills, July 16, 1914; 4 females, Orient, August 19, 1909 (J. L. Zabriskie); male, female, Cold Springs Harbor, L. I., June 22, 1921 (E. G. Anderson); 2 males, Cold Springs Harbor, L. I., June 22, 1921 (S. H. Emerson); 3 males, 3 females, Cold Springs Harbor, L. I., June 24, 1921 (S. H. Emerson); 2 males, 2 females, Cold Springs Harbor, L. I., June 24, 1921 (E. G. Anderson); 3 females, Cold Springs Harbor, L. I., June 17, 1921 (E. G. Anderson); 2 males, 5 females, Cold Springs Harbor, L. I., June 27, 1921 (S. H. Emerson); male, Cold Springs Harbor, L. I., June 28, 1921 (S. H. Emerson); 2 males, female, Cold Springs Harbor, L. I., June 28, 1921 (E. G. Anderson); male, Cold Springs Harbor, L. I., July 3, 1921 (E. G. Anderson); 2 females, Cold Springs Harbor, L. I., July 8, 1921 (E. G. Anderson); male, 4 females, Cold Springs Harbor, L. I., July 9, 1921 (E. G .Anderson); female, Cold Springs Harbor, L. I., July 16, 1921 (S. H. Emerson); male, Cold Springs Harbor, L. I., July 18, 1921 (S. H. Emeron); male, Cold Springs Harbor, L. I., July 22, 1921 (S. H. Emerson); female, Cold Springs Harbor, L. I., August 3, 1920 (Priscilla Butler); female, Cold Springs Harbor, L. I., August 9, 1921 (S. H. Emerson); female, Cold Springs Harbor, L. I., August 25, 1921 (S. H. Emerson); female, Cold Springs Harbor, L. I., September 13, 1922 (E. G. Anderson); female, Santapogee Creek, L. I., July 25, 1903; 2 females, Selden, L. I., August 30, 1916 (W. T. Davis); female, Selden, L. I., September 1, 1916 (W. T. Davis); male, Yaphank, L. I., July 9; female, Yaphank, L. I., August 27, 1916 (W. T. Davis); female, Amityville, L. I., July 4, 1921 (S. H. Emerson); 2 females, Wading River, L. I., female, Long Island, July 18, 1898 (J. Akhurst); 2 females, Long Island; female, Pelham, August 7, 1898; female, West Farms (J. Angus); female, Mosholu, August 9, 1898; female, Mosholu; female, Watchopec, July 14, 1921.

North Carolina: Male, Southern Pines, June 6, 1906 (R. Woglum); female, Southern Pines, July 5, 1913 (A. H. Manee); female, Southern Pines, July 26, 1913 (A. H. Manee); female, Southern Pines, September 12, 1918; female, Raleigh, September, 1913 (C. L. Metcalf); male, Overhills, August 27, 1919 (J. E. Eckert); female, Newton, July 25, 1904 (G. M. Bentley).

Ohio: Male, Cedar Point, July 4, 1915 (V. R. Haber); 2 males, Cedar Point, July 5, 1915 (V. R. Haber); 6 females, Cedar Point, July 8, 1915 (V. R. Haber); 3 females, Cedar Point, July 9, 1915 (V. R. Haber); male, Cedar Point, July 15, 1914 (O. Gossard).

Ontario, Canada: Female, Guelph (G. E. Sanders).

Pennsylvania: Female, 2 males.

South Carolina: Female, Swansea, August 7, 1911 (Frederick Knab).

Tennessee: 2 males, Grassy Cove, Cumberland County, July 8, 1922 (T. H. Hubbell).

Texas: Female, Nacogdoches, July 1, 1906 (F. C. Bishopp); female, Rosser, July 28, 1905 (C. R. Jones); female, Mineola, July 19, 1906 (Bishopp and Jones).

Virginia: Female, Nelson County, July 6, 1914 (W. Robinson).

39. DASYMUTILLA PYRRHUS (Fox)

Mutilla pyrrhus Fox, Trans. Amer. Ent. Soc., vol. 25, p. 243, 1899, male.

Ephuta (*Ephuta*) *pyrrhus* André, Gen. Ins., vol. 1, fasc. 11, p. 63, 1903, male.

Dasymutilla (*Dasymutilla*) *pyrrhus* Bradley, Trans. Amer. Ent. Soc., vol. 42, p. 322, 1916, male.

Type.—Male, Enterprise, Fla., May 11; in collection of American Entomological Society of Philadelphia.

Distribution.—Florida.

SPECIMENS EXAMINED

FLORIDA: Male, Marco, April 20, 1912; male, Long Boat Key, Sarasota, August 14, 1910 (J. C. Bradley); male, Tampa, May 2, 1908 (Van Duzee); male, Lake County, April 18, 1922 (T. P. Winter); 4 males, Lake County, April 20, 1922 (T. P. Winter); 2 males, Lake County, April 22, 1922 (T. P. Winter); male, LaBelle, April 27, 1912; 3 males, LaBelle, May 8–10, 1916 (J. C. Bradley).

The type of this species has been examined and the specimens placed here are identical with it. The genitalia of this species are exactly like those of *lepeletierii* (Fox) and are therefore not figured. *Pyrrhus* differs from *lepeletierii* principally in the ferruginous pubescence of the head and thorax above.

40. DASYMUTILLA CREUSA (Cresson)

Mutilla creusa CRESSON, Proc. Phila. Ent. Soc., vol. 4, p. 431, 1865, female.—BLAKE, Trans. Amer. Ent. Soc., vol. 7, p. 244, 1879, female.—DALLE TORRE, Cat. Hymen., vol. 8, p. 28, 1897, female.—FOX, Trans. Amer. Ent. Soc., vol. 25, p. 238, 1899, female (in part).—MELANDER, Trans. Amer. Ent. Soc., vol. 29, p. 297, 1903, female (part).

Mutilla (*Sphaerophthalma*) *creusa* BLAKE, Trans. Amer. Ent. Soc., vol. 3, p. 236, 1871, female.

Sphaerophthalma creusa BLAKE, Trans. Amer. Ent. Soc., vol. 13, p. 223, 1886, female.

Ephuta (*Ephuta*) *creusa* ANDRÉ, Gens. Ins., vol. 1, fasc. 11, p. 59, 1903, female.

Type.—Female, Colorado Territory, in collection of American Entomological Society of Philadelphia.

Distribution.—Texas, Oklahoma, Arkansas, Kansas, Nebraska, Colorado, and New Mexico.

SPECIMENS EXAMINED

ARKANSAS: Female, Little Rock, October 11, 1917.

COLORADO: 6 females, Lamar, July 10, 1899; female, Bent County (Lantz); female, La Junta, July 22–23, 1919 (Rehn and Hebard); female, Trinidad, July 13, 1899; female, Fremont County, September 5; female, Colorado Springs, August (E. S. Tucker); female, Colorado Springs (Cockerell); female, Platte Canyon, July (Oslar); female, Turkey Creek Canyon, June (Oslar); female, Turkey Creek Canyon, July (Oslar); female, Denver, August 12; female, White Rock, Boulder County, July 30 (Cockerell); female, White Rock, Boulder County, August 13 (Cockerell); female, Boulder Canyon, July 15, 1908 (G. von Krakow); female, Valmont Buttes, July 25, 1908 (G. von Krakow); female, Fort Collins, July 29, 1900; female, Fort Collins, August 8, 1899; female, Fort Collins; female, Livermore, September 3, 1899; female (Popenoe); female, Clear Creek, August 3, 1899 (Oslar); female, Clear Creek, August 3, 1906 (Oslar); 5 females, Ridgway, July (Oslar); 2 females, Silverton, August (Oslar); female, Durango, July 25, 1900 (Oslar); female, Drennan, August 17, 1924; 4 females.

KANSAS: Female, Pratt County, June 27, 1911 (F. X. Williams); 2 females, Comanche County, 1916 (R. H. Beamer); 2 females, Ellis County, July 19, 1912 (F. X. Williams); 3 females, Clark County, June (F. H. Snow); female, Clark County, August 27, 1911 (F. X. Williams); 2 females, Trego County, July 12, 1912 (F. X. Williams); 4 females, Graham County, August 16, 1912 (F. X. Williams); female, Norton County, August 24, 1912 (F. X. Williams); 8 females, Meade County, July 10, 1911 (F. X. Williams); female, Grainfield, September 23 (Lantz); 8 females, Seward County, August 16, 1911 (F. X. Williams); 4 females, Seward County, August 18, 1911 (F. X. Williams); female, Scott County (F. X. Williams); female, Logan County, September 2; female, Rawlins County (F. X. Williams); 3 females, Grant County, July 23, 1911 (F. X. Williams); 2 females, Grant County, July 27, 1911 (F. X. Williams); 3 females, Wichita County (F. X. Williams); 2 females, Morton County, June, 1902 (F. H. Snow); 8 females, Morton County, August 5, 1911 (F. X. Williams); 2 females, Stanton County, July 30, 1911 (F. X. Williams); female, Hamilton County, August 27; 2 females, Wallace County, July 7; 2 females, Wallace County, July 8; female, Wallace County, July 9; female, Wallace County, August 31; 5 females, Wallace County (F. X. Williams); female, Sherman County (F. X. Williams); female, Cheyenne County (F. X. Williams).

NEBRASKA: Female, Haigler, June 26, 1905; female, Haigler, July 4, 1911 (J. T. Zimmer); female, Scottsbluff, August 3, 1923 (Leonard Worley); female, Mitchell, July 22, 1916 (C. E. Mickel); female, Glen, August 13, 1906 (H. S. Smith); female, Glen, August 20, 1906 (H. S. Smith); female, Glen, August, 1906; female, Monroe Canyon, Sioux County, July 28, 1913 (R. W. Dawson); female, Bad Lands, Sioux County, August 10, 1908 (C. H. Gable).

NEW MEXICO: Female, Las Cruces, August 26 (Townsend); female, Mesilla Park, September 17 (Cockerell); White Mountains, August 3 (Townsend); female, Koehler, August 12, 1914 (W. R. Walton); female, Koehler (W. R. Walton); female, Koehler (H. F. Wickham); female, Roswell, August (Cockerell); female, Las Vegas, June 8 (Barber and Schwarz); female, Springer (C. N. Ainslie); 2 females, Santa Rosa, July (W. Knaus); female, Gallinas Canyon, July 25, 1902 (Oslar); female.

OKLAHOMA: Female, Perkins, July, 1914 (Skinner); female, Payne County, June 3, 1925 (W. J. Brown); female, Payne County, June 24, 1925 (W. J. Brown).

TEXAS: Female, Galveston, May (F. H. Snow); female, Richmond, May 29, 1918 (J. C. Bradley); 3 females, Richmond, June 22, 1917; 21 females, Wharton, June 24, 1917; female, Colorado County, September 4, 1922 (Grace O. Wiley); female, Columbus, August 9, 1922 (Grace O. Wiley); 2 females, Columbus (Wickham); female, Austin (W. M. Wheeler); female, Gurley, July 6, 1905 (A. C. Morgan); female, Eastland County, May 25, 1921 (Grace O. Wiley); female, Eastland County, May 31, 1921 (Grace O. Wiley); female, Eastland County, June 18, 1921 (Grace O. Wiley); female, Eastland County, September 11, 1920 (Grace O. Wiley); female, Marathon, June 7, 1908 (Mitchell and Cushman); female, Handler, August 3, 1905 (W. D. Pierce); female, Big Springs; female, Phantom Lake, Fort Davis Quad, June 15, 1916 (F. M. Gaige); 2 females, Phantom Lake, Fort Davis Quad, June 6, 1916 (F. M. Gaige); female, Phantom Lake, Fort Davis Quad, July 13, 1916 (F. M. Gaige); female, Phantom Lake, Fort Davis Quad, July 15, 1916 (F. M. Gaige); female, Cherry Canyon, Fort Davis Quad, June 29, 1916 (F. M. Gaige); female, Chancellor, Pecos County, July 5, 1917.

The specimens in the above series vary in length from 7.5 mm. to 15 mm. The color of the pubescence varies from pale yellow to ferruginous. The pubescent markings of the abdominal tergites also show considerable variation. In typical specimens the ferruginous pubescence of the second tergite extends to the apical margin and the apical fringe is concolorous with it, the former being slightly interrupted medially by an obscure spot of black pubescence, and the third tergite has the disk fairly well clothed with ferruginous pubescence, the remaining tergites clothed with black pubescence. In other specimens, however, the apical fringe of the second tergite is either entirely or mostly black, and the third segment is entirely clothed with black pubescence. Many intergrades are present in the series and the writer has considered all of these as individual variants of a single species.

41. DASYMUTILLA CREUSA var. BELLONA (Cresson)

Mutilla bellona Cresson, Proc. Phila. Ent. Soc., vol. 4, p. 434, 1865, female.—Blake, Trans. Amer. Ent. Soc., vol. 7, p. 244, 1879, female.—Dalle Torre, Cat. Hymen., vol. 8, p. 15, 1897, female.

Mutilla (*Sphaerophthalma*) *bellona* Blake, Trans. Amer. Ent. Soc., vol. 3, p. 235, 1871, female.

Sphaerophthalma bellona Blake, Trans. Amer. Ent. Soc., vol. 7, p. 244, 1886, female.

Mutilla creusa Fox, Trans. Amer. Ent. Soc., vol. 25, p. 239, 1899, female (in part).

Type.—Female; Colorado Territory, in collection of American Entomological Society of Philadelphia.

Distribution.—Arkansas, Kansas, Nebraska, Colorado, and Wyoming.

SPECIMENS EXAMINED

Arkansas: Female, Pine Bluff, September, 1890.

Colorado: Female, Fort Collins, August 24, 1899; female, Fort Collins; female, Greeley, September 17, 1898.

Kansas: Female, Riley County, September 1 (Popenoe); female, Rooks County, August 9, 1912 (F. X. Williams); female, Mitchell County, August 25; female, Wallace County, July 7.

Nebraska: Female, McCook, July, 1908 (M. H. Swenk); female, Curtis, July 25, 1917 (C. E. Mickel); female, Mitchell, July 25, 1916 (C. E. Mickel); female, Harrison, August 12, 1912 (R. W. Dawson); female, Harrison, August 15, 1908 (C. H. Gable).

Wyoming: Female, Douglas (L. Bruner).

This variety is identical with *creusa* with the exception that the narrow lateral margins of abdominal tergites 3–5 and the abdominal sternites entirely are clothed with pale silvery pubescence.

42. DASYMUTILLA MEDEA (Cresson)

Mutilla medea Cresson, Proc. Ent. Soc. Phila., vol. 4, p. 432, 1865, female.—Blake, Trans. Amer. Ent. Soc., vol. 7, p. 244, 1879, female.—Dalle Torre, Cat. Hymen., vol. 8, p. 59, 1897, female.—Melander, Trans. Amer. Ent. Soc., vol. 29, p. 297, 1903, female.

Mutilla (*Sphaerophthalma*) *medea* Blake, Trans. Amer. Ent. Soc., vol. 3, p. 236, 1871, female.

Sphaerophthalma medea Blake, Trans. Amer. Ent. Soc., vol. 13, p. 224, 1886, female.

Mutilla creusa Fox, Trans. Amer. Ent. Soc., vol. 25, p. 238, 1899, female (part).

Type.—Female, Colorado Territory, in collection of American Entomological Society of Philadelphia.

Distribution.—Colorado and New Mexico.

SPECIMENS EXAMINED

New Mexico: Female, Las Cruces, September (Cockerell); 3 females, Las Cruces; female, Mesilla Park, June 14 (Cockerell); female, Mesilla Park, August 3 (Cockerell); female, Mesilla Park, August 9 (Cockerell); female, Mesilla Park, August 24 (Cockerell); 2 females, Mesilla, June (Cockerell); female, Mesilla; female, Las Vegas, July 23 (Cockerell); female, St. Augustine (Cockerell); female.

This species is almost exactly like *creusa* but has the antennal scrobes carinate above.

43. DASYMUTILLA URSULA (Cresson)

Mutilla ursula Cresson, Trans. Amer. Ent. Soc., vol. 5, p. 120, 1875, male.—Blake, Trans. Amer. Ent. Soc., vol. 7, p. 244, 1879, male.—Dalle Torre, Cat. Hymen., vol. 8, p. 95, 1897, male.—Fox, Trans. Amer. Ent. Soc., vol. 25, p. 242, 1899, male.

Sphaerophthalma ursula Blake, Trans. Amer. Ent. Soc., vol. 13, p. 218, 1886, male.

Ephuta (*Ephuta*) *ursula* André, Gen. Ins., vol. 1, fasc. 11, p. 64, 1903, male.

Type.—Male, Texas, in collection of American Entomological Society of Philadelphia.

Distribution.—Texas, New Mexico, Arizona, Kansas, Colorado, Wyoming, Utah, Idaho, Montana, Oregon, and British Columbia. (Fig. 13.)

A male and female taken in copula were collected at Deming, Luna County, N. Mex., July 12, 1917. The female has heretofore been undescribed. The description is as follows:

Female.—Dark mahogany red, except the front and vertex, dorsum of thorax, and second abdominal tergite, all bright ferruginous, and clothed with long, dense, erect, ferruginous pubescence; abdominal tergites 3–5 clothed laterally with whitish pubescence, the third very broadly, leaving a narrow median area of black, the fourth with a broad median area of black and the fifth almost entirely black with only a little white pubescence laterally. Length, 12 mm.

Head dark mahogany red and clothed with sparse, black pubescence, except the front and vertex ferruginous and clothed with long, dense, erect, ferruginous pubescence; mandibles acute at the apex, unidentate within; clypeus feebly bidentate medially on the apical margin; cephalic half of clypeus transversely concave, glabrous, impunctate; caudal half of clypeus finely, confluently punctate; apical fringe black; scape dark mahogany red, with large, close punctures, sparsely clothed with coarse, dark pubescence; first segment of flagellum one and one-third times as long as it is broad at the apex; antennal scrobes weakly carinate above, the carina extending a little more than half the distance from the antennal tubercles to the margins of the eyes; front and vertex coarsely, confluently punctured; genae with very close, distinct punctures, not nearly as coarsely punctured as the front and vertex; relative widths of head and thorax, 7.5–8.75.

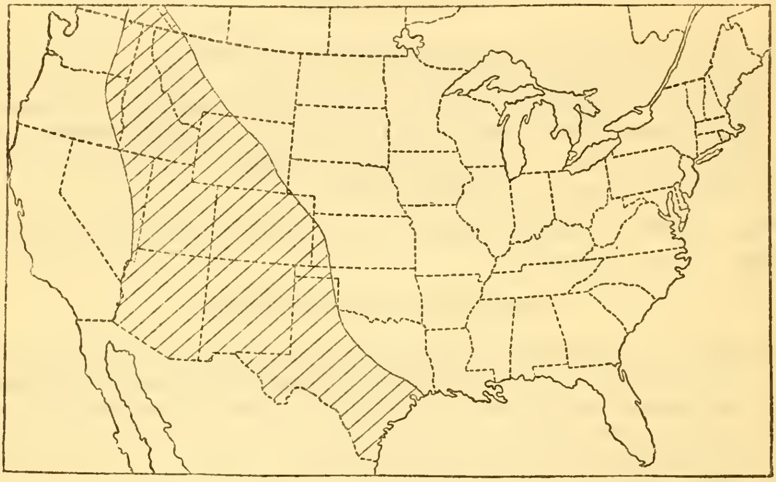

Fig. 13.—Distribution of Dasymutilla ursula (Cresson)

Thorax dark mahogany red, clothed with sparse, long, black hairs on the sides; dorsum of thorax bright ferruginous, clothed with long, dense, erect, ferruginous pubescence; dorsum of thorax confluently foveate; propleura with large, confluent punctures; anterior half of mesopleura with small, close, distinct punctures, the posterior half with large, coarse, confluent punctures; ventral half of metapleura with coarse, confluent punctures, the latter becoming separated toward the dorsal margin of the area, the dorsal half of the metapleura glabrous, impunctate; anterior half of sides of propodeum with large, separated punctures, the posterior half contiguously foveate;

ventral half of posterior face of propodeum irregularly, confluently punctate, the dorsal half coarsely foveate and clothed with long, dense, erect, ferruginous pubescence; scutellar scale prominent; a transverse sinuate carina just anterior to the scutellar scale extending completely across the dorsum of the thorax.

Abdomen dark mahogany red; first tergite with moderate, confluent punctures and sparse, long, black pubescence on the cephalic and caudal fourths, the transverse median area glabrous, impunctate, without pubescence; apical fringe of first tergite black; second tergite bright ferruginous, with moderate, elongate, confluent punctures, the extreme anterior margin glabrous, impunctate. clothed with long, dense, erect, ferruginous pubescence, except laterally with sparse, pale pubescence and the apical fringe whitish, narrowly interrupted medially with black; third tergite closely, confluently punctate, the pubescence laterally mostly whitish and recumbent with a few golden hairs intermixed, scattered, erect. black hairs throughout, the pubescence of the median area black, and the apical fringe whitish, broadly interrupted medially with black; fourth tergite with moderate, distinct punctures, lateral thirds of tergite with whitish recumbent pubescence and scattered, erect black hairs, the pubescenc of the median third black; fifth tergite with distinct punctures, the pubescence mostly black, narrowly whitish at the sides; pygidium distinctly, longitudinally striate; anterior half of first sternite with a prominent, longitudinal carina, the latter obsolete on the posterior half, the sternite with large, contiguous punctures and sparse, erect, pale pubescence; second sternite with small, very sparse punctures medially, the punctures becoming coarse and almost contiguous toward the lateral and caudal margins, sparsely clothed with pale pubescence, and with a thick apical fringe of whitish pubescence; sternites 3–5 contiguously punctured subapically, 3 and 4 with apical fringes of whitish pubescence, 5 with an apical fringe of black pubescence; ultimate sternite punctate and with black pubescence.

Legs very dark mahogany red, sparsely clothed with long, black hairs.

Allotype.—Female, Durango. Colo., July 28, 1900 (Oslar), in collection of American Entomological Society of Philadelphia.

SPECIMENS EXAMINED

ARIZONA: Female, Douglas, August (Snow); male, Wilcox, July 31, 1909 (A. K. Fisher); male, Wilcox, July 31, 1909; female, Post Creek Canyon,, Pinaleno Mountains, Fort Grant, July 15–18, 1917; male, female, Fort Grant, Pinaleno Mountains, July 15–19, 1917; female, Fort Grant, July 14, 1917; female, Huachuca Mountains, July 16; female, Tucson, July 12, 1924 (A. A. Nichol); 2 females, Santa Rita Mountains, July (Snow); 5 females, Oak Creek Canyon, July (Snow); female, Humphrey's Peak (Snow); female, Florence, July 26, 1903 (C. R. Biedermann); 2 females, Sacaton, July 27, 1924 (J. A. Harris, Jr.); 3 females, Sacaton, August 7, 1923 (J. A. Harris, Jr.); 3 females, Winslow, July 31 (Barber and Schwarz); 5 females, Winslow (Wickham); female, Williams, July 11 (Barber and Schwarz); female, Palmerlee, July 17 (H. A. Kaeber); female, Leupp, July 1, 1911 (W. T. Davis); female, Leupp, July 3, 1911 (W. T. Davis); 4 males, 2 females.

British Columbia, Canada: 3 males, Vernon, July 25, 1917 (Sladen); male, Okanagan, July 30, 1915; 4 males, Okanagan, August; male, Dog Lake; 4 males, female, Osoyoos; male, Oliver, June 6, 1923 (E. R. Buckell); 2 females, Oliver, July 24, 1923 (E. R. Buckell).

Colorado: 2 females, South Park, August 17, 1901 (Oslar); 2 females, South Park, August 19, 1901 (Oslar); 2 females, South Park, August 21, 1901 (Oslar); female, Salida, July 20 (Lantz); female, male, Antonito, August 5, 1899; female, Antonito, August 5, 1900; male, Durango, June 30, 1900 (Oslar); female, Durango, July 4, 1900 (Oslar); 2 females, Durango, July 17, 1900 (Oslar); male, Durango, July 25, 1900 (Oslar); female, Durango, July 28, 1901 (Oslar); female, Cortez, August 10, 1903; male, S. W. Colorado, July 25, 1901 (Oslar); 2 females, Delta, June 8, 1901 (Dyar and Caudell); 10 males, 11 females, Delta, July 20, 1898; female, Maybell, August 1, 1904; male.

Kansas: 2 females, Wallace County (F. H. Snow).

Idaho: 12 males, 16 females, Springfield, July 24 (H. Skinner).

Montana: 2 females, Missoula, July 16, 1904.

New Mexico: Male, Las Cruces, July 13; male, female, Las Cruces; 2 females, Mesilla Park, August 8 (Cockerell); 2 males, Mesilla, June 30, 1897 (Cockerell); male, Mesilla, August 15 (Cockerell); female, Pecos, August 4, 1903 (Cockerell); 2 males, Albuquerque, July 16, 1902 (Oslar); 4 males, Albuquerque, July 17, 1902 (Oslar); 3 males, Albuquerque, July 18, 1902 (Oslar); 6 males, Albuquerque, July 19, 1902 (Oslar); female, Albuquerque, July 29, 1919 (Rehn and Hebard); 2 males, Albuquerque, August, 1894 (F. H. Snow); female, Albuquerque, September 17 (Cockerell); female, Albuquerque (Wickham); 6 males, Albuquerque (Oslar); male, Arrayo Pecos River, July 21, 1902 (Oslar); female, Jemez Springs, April 10, 1916 (John Woodgate); male, female, Jemez Springs, June 24, 1916 (John Woodgate); male, Jemez Springs, July 5, 1916 (John Woodgate); female, Jemez Springs, July 9, 1916 (John Woodgate); 2 females, Jemez Springs, July 15, 1916 (John Woodgate); female, Jemez Springs, July 19, 1916 (John Woodgate); female, Jemez Springs, July 25, 1916 (John Woodgate); female, Jemez Springs, July 28, 1914; 3 females, Jemez Springs, July 28, 1916 (John Woodgate); female, Jemez Springs, August 2, 1913 (John Woodgate); female, Jemez Springs, August 5, 1916 (John Woodgate); 2 females, Jemez Springs, August 7, 1916 (John Woodgate); female, Jemez Springs, August 19, 1916 (John Woodgate); 2 females, Jemez Springs, August 25, 1916 (John Woodgate); female, Jemez Springs, September 3, 1916 (John Woodgate); female, Jemez Springs, September 11, 1916 (John Woodgate); female, male, Glorieta, August 23 (Cockerell); 2 males, Koehler, August 6, 1914 (W. R. Walton); male, Koehler, August 12, 1914 (W. R. Walton); 3 males, Koehler (W. R. Walton); 2 males, Las Vegas, July 20, 1902 (Oslar); male, Las Vegas (Oslar); male, Maxwell (G. W. Barber); female (F. H. Snow); female, 3 males.

Oregon: Male.

Texas: 2 males, Wharton, June 24, 1917; male, Austin (W. M. Wheeler); male.

Utah: Male, top Parowan Mountains, July, 1921 (Knaus); male, St. George, Washington County, August; female, South Creek, Beaver County; female, Wildcat Valley, Beaver County; female, Emery County, July 14, 1921 (Grace O. Wiley); female, Emery County, August 1, 1921 (Grace O. Wiley); female, Salt Wash Creek, Emery County, August 8, 1921 (Grace O. Wiley); female, Emery County, August 14, 1921 (Grace O. Wiley); female, Emery County, August 19, 1921 (Grace O. Wiley); female, Emery County, August 21, 1921 (Grace O. Wiley); male, Vineyard, July 11 (Tom Spalding); male, Vineyard, July 14 (Tom Spalding); female, Vineyard, September 4 (Tom Spalding); female, Vineyard, September 23 (Tom Spalding); female, Vineyard, October 7 (Tom Spalding); female, North Fork Provo Canyon, August 8 (Tom Spalding); female, Salt Lake, August 6, 1907; female, Ogden, September, 1894 (C. C. Adams); female, Logan, August 16, 1906; 2 females, Logan; female, Point Mountain, July 20, 1909 (E. G. Titus); female, Olivers, August 15, 1909 (E. G. Titus); male, Sand dunes, July 12, 1923 (J. A. Harris, Jr.).

Wyoming: 6 females, Worland, August 1, 1911 (L. Bruner); female, Douglas.

The males vary in length from 8 mm. to 15 mm. In most of them the apical half of the second abdominal tergite has a pair of large, yellow, round spots, but in the specimens from Arizona the spots have coalesced and the second tergite is largely yellow. Usually the pubescence on the anterior portion of the pygidial tergite is black but in some specimens from New Mexico, Arizona, and Texas this pubescence is yellow. The genitalia are like those of *lepeletierii* and are therefore not figured.

The females have been confused with *bioculata* Cresson, but differ from that species in the pubescent markings of the abdominal tergites 3–5. In *bioculata* the fourth and fifth tergites are clothed with golden pubescence while in *ursula* the black pubescence on the median portions of tergites 3–5 forms a triangle with the apex at the median base of tergite 3; this area of black pubescence is characteristic of the species.

In the specimens from Logan, Point Mountain, and Beaver County, Utah, Springfield, Idaho, and Missoula, Mont., the triangular area of black pubescence on abdominal tergites 3–5 is broader and more extended than on the type, and the pubescence of the sternites is mostly black. Four specimens from Emery County, Utah, have the pubescence yellow rather than ferruginous. The specimens from Douglas, Palmerlee, Santa Rita Mountains, Oak Creek Canyon, and Post Creek Canyon, Ariz., have the area of black pubescence reduced to a mere interruption of the pale pubescence medially on tergites 3–5, and the apical fringe of the first tergite is white. The length of the females varies from 6 to 15 mm. and the smaller specimens from Delta, Colo., have the antennal scrobes without any evidence of a carina above.

44. DASYMUTILLA URSULA var. CHIRON (Blake)

Mutilla chiron Blake, Trans. Amer. Ent. Soc., vol. 4, p. 72, 1872, male; Trans. Amer. Ent. Soc., vol. 7, p. 244, 1879, male.—Dalle Torre, Cat. Hymen., vol. 8, p. 23, 1897, male.—Fox, Trans. Amer. Ent. Soc., vol. 25, p. 244, 1899, male.

Mutilla ursula var. *texana* Cresson, Trans. Amer. Ent. Soc., vol. 5, p. 120, 1875, male.—Dalle Torre, Cat. Hymen., vol. 8, p. 95, 1897, male.

Sphaerophthalma chiron Blake, Trans. Amer. Ent. Soc., vol. 13, p. 220, 1886, male.

Ephuta (*Ephuta*) *chiron* André, Gen. Ins., vol. 1, fasc. 11, p. 58, 1903, male.

Ephuta (*Ephuta*) *ursula* var. *texana* André, Gen. Ins., vol. 1, fasc. 11, p. 64, 1903, male.

Type.—Male, Bosque County, Texas, in collection of American Entomological Society of Philadelphia. The type of *ursula* var. *texana* Cresson is in the collection of the American Entomological Society of Philadelphia.

Distribution.—Texas.

SPECIMENS EXAMINED

Texas: Male, Austin (W. M. Wheeler); male, Goliad County, June 4, 1906 (C. R. Jones); 2 males, Brewster County, June 13–17, 1908 (Mitchell & Cushman).

Cresson's var. *texana* appears to be identical with Blake's *chiron*, both presenting all the characteristics of *ursula* Cresson except the color of pubescence of the head and thorax. *Chiron* has the pubescence of the head and thorax black. Since the name "*chiron*" has priority it should replace *texana* as the varietal name. The genitalia are identical with those of *lepeletierii* Fox.

45. DASYMUTILLA PRAEGRANDIS, new species

Male.—Black, except second abdominal segment ferruginous; sparsely clothed with long, black, erect pubescence, except a pair of large subapical areas on the second abdominal tergite with yellowish pubescence; antennal scrobes carinate above; basal fourth of lateral lobes of anterior division of scutellum glabrous, impunctate; length, 19 mm.

Head black, sparsely clothed with long, erect, black pubescence; mandibles tridentate at the apex; clypeus bidentate medially on the cephalic margin; disk of clypeus moderately, confluently punctate throughout; scape bicarinate beneath, confluently punctate and sparsely clothed with long, erect, black pubescence; first segment of flagellum three-fourths as long as the second; antennal scrobes distinctly carinate above; front moderately, confluently punctate; vertex and genae with the punctures separated, not confluent; occiput with broad lateral depressions leaving a distinctly elevated median area; relative widths of head and thorax, 9–13.

Thorax black, sparsely clothed with long, erect, black pubescence; cephalic margin of pronotum slightly emarginate medially, the cephalic surface of the emargination glabrous, impunctate; pronotum, mesonotum, posterior division of scutellum, and metanotum coarsely, confluently punctate throughout; basal fourth and apical margin of lateral lobes of anterior division of scutellum glabrous, impunctate, the remainder coarsely and deeply foveolate; propleura coarsely, confluently punctate, interspersed with fine punctures near the posterior margin; mesopleura with very large, coarse punctures near the anterior margin, interspersed with fine punctures, the remainder very coarsely and deeply foveolate; ventral third of metapleura deeply foveolate, the dorsal two-thirds glabrous, impunctate; sides of propodeum glabrous, impunctate at the anterior margin, then coarsely punctate, and finally very coarsely, deeply foveolate near the posterior margin; posterior face and dorsum of propodeum very coarsely, deeply foveolate, the apical half of the dorsum with a median, longitudinal carina which extends onto the dorsal part of the posterior face of the propodeum; anterior half of tegulae setigerously punctate, posterior half glabrous, impunctate.

Abdomen black, except the second segment ferruginous; first tergite black, slightly constricted subapically, coarsely, confluently punctate, except the disk with elongate, separated punctures, sparsely clothed with long, erect, black pubescence; second tergite ferruginous, with moderate, distinct punctures medially, the punctures becoming larger toward the lateral margins, clothed with long, erect, black pubescence, except a pair of large subapical areas with yellowish pubescence, and with a thick apical fringe of black pubescence; tergites 3–6 with moderate, contiguous punctures throughout, sparsely clothed with long, erect, black pubescence and each with an apical fringe of black pubescence; basal area of ultimate tergite with fine, distinct punctures, sparsely clothed with long, erect, black pubescence, the pygidial area glabrous, slightly rugose, the apical margin of the tergite with a distinct fringe of erect, black pubescence; first sternite with a median, longitudinal carina, not produced posteriorly, the sternite coarsely, confluently punctate and sparsely clothed with long, erect, black pubescence; second sternite ferruginous, with a median, slightly ovate pit densely filled with black hairs, the sternite with large, distinct punctures, sparsely clothed with long, erect, black pubescence and with a thick apical fringe of long, black hairs; sternites 3–6 with the apical margins punctate and each with an apical fringe of long, black pubescence; ultimate sternite with the broad, apical margin glabrous, impunctate, remainder of sternite with intermixed large and small, distinct punctures.

Legs black, sparsely clothed with long, black pubescence.

Wings dark fuliginous; cell 2nd R_1+R_2 broadly truncate at the apex; cell R_4 almost obsolete; vein M_{3+4} received by cell R_5 at two-fifths the distance between the base and the apex; veins r–m and R_5 separated on vein r.

Female.—Dark ferruginous, sparsely clothed with ferruginous, recumbent pubescence, except broad apical margin of second abdominal tergite, and abdominal tergites 3–5 with black pubescence; head distinctly narrower than the thorax; length, 17 mm.

Head dark ferruginous, sparsely clothed with recumbent ferruginous pubescence and scattered erect hairs; mandibles acute at the apex, unidentate within; clypeus transversely concave on the cephalic half, glabrous, impunctate, the cephalic margin feebly dentate; caudal half of clypeus finely, confluently punctate, the long, erect pubescence forming a clypeal fringe; scape coarsely, contiguously punctate, sparsely clothed with ferruginous pubescence; first segment of flagellum short and broad, one and one-half times as long as it is broad at the apex; antennal scrobes not carinate above; front and vertex with coarse, confluent punctures throughout; genae with large, contiguous punctures, not as coarsely punctured as the front; relative widths of head and thorax, 10–12.

Thorax dark ferruginous, sparsely clothed above with recumbent ferruginous pubescence and scattered, erect hairs; dorsum of thorax very coarsely, deeply and confluently punctured; propleura coarsely, confluently punctate throughout; anterior third of mesopleura finely, contiguously punctate, the posterior two-thirds very coarsely, confluently punctate; ventral third of metapleura coarsely, confluently punctate, the dorsal third with small separated punctures, the median third with intermixed small and large punctures, clothed throughout with dark, recumbent pubescence; sides of propodeum with coarse, more or less confluent punctures, sparsely clothed with long, ferruginous pubescence; posterior face of propodeum with small, close punctures intermixed with large punctures on the ventral half, the latter sparsely clothed with ferruginous, recumbent pubescence, and scattered, long, black, erect hairs; dorsal half of posterior face of propodeum and dorsum of propodeum coarsely, deeply foveolate, densely clothed with ferruginous pubescence at the junction of the posterior face and the dorsum; scutellar scale present; a somewhat sinuate, transverse carina immediately anterior to the scutellar scale.

Abdomen ferruginous; disk of first tergite glabrous, with a few widely scattered punctures, the apical marginal area confluently punctate, very sparsely clothed with long, erect, dark hairs, a few ferruginous ones near the median apical margin, and an apical fringe of black pubescence; first tergite laterally distinctly dentate just anterior to the median line; second tergite with elongate, contiguous punctures, the punctures larger laterally, the disk clothed with sparse, recumbent, ferruginous pubescence, at the base medially a few black hairs, laterally with sparse, black pubescence, and the apical margin with a thick fringe of black pubescence; tergites 3–5 with moderate, shallow contiguous punctures throughout, sparsely clothed with long, black pubescence; pygidial area, coarsely, longitudinally striate, the striae not extending to the apical margin; first sternite produced anteriorly into a prominent tooth, with large contiguous punctures, and sparsely clothed with long, black, erect pubescence; second sternite with distinct separated punctures, the punctures larger laterally and caudally, very sparsely clothed with long, dark ferruginous pubescence and with an apical fringe of blackish pubescence; sternites 3–5 with large, contiguous punctures throughout and each with an apical fringe of black pubsecence; ultimate sternite confluently punctate and sparsely clothed with black pubsecence.

Leg black, sparsely clothed with dark ferruginous pubescence.

Holotype.—Male, Cat. No. 40725, U.S.N.M., Rosser, Tex., June 28, 1905 (C. R. Jones).

Allotype.—Female, Rosser, Tex., June 28, 1905 (C. R. Jones), in collection of United States National Museum.

Paratypes.—Female, Colorado County, Tex., August 25, 1922 (Grace O. Wiley); female, Columbus, Tex. (Wickham); 5 males, 5 females, Rosser, Tex., June 28, 1905 (C. R. Jones); female, Rosser, Tex., July 6, 1905 (C. R. Jones); female, Rosser, Tex., July 6, 1905 (F. C. Bishopp); female, Rosser, Tex., July 7, 1905 (C. R. Jones); female, Rosser, Tex., September 23, 1905 (C. R. Jones); female, Calvert, Tex., August 23, 1907 (R. A. Cushman); 2 females, Mineola, Tex., July 19, 1906 (Bishopp and Jones); in collections of United States National Museum, the University of Minnesota, and the author.

The large size of both the male and female, and the section of the genus to which they belong, leads me to place these specimens as male and female of the same species. The genitalia of the male are like those of *lepeletierii* and are therefore not figured. The antennal scrobes carinate above, the broad, glabrous and impunctate base of the lateral lobes of the anterior division of the scutellum, the carina defining the cephalic margin of the propleura not reaching the humeral tubercle, the coarser puncturation of abdominal tergites 3–6, and its large size distinguish the male from the male of *lepeletierii.* The male paratypes vary in length from 14 to 20 mm.

The glabrous area at the base of the lateral lobes of the anterior division of the scutellum varies in area from one-fourth to one-third of the lobes themselves.

The female paratypes vary in length from 13 to 18 mm.; one specimen has the apical margins of the second, third, and fourth abdominal sternites with a fringe of pale golden pubescence.

46. DASYMUTILLA PRAEGRANDIS var. RUSSATA, new variety

Male.—Exactly like *praegrandis* except the pronotum, mesonotum and scutellum clothed with golden yellow pubescence, rather than black pubescence. Length, 18 mm.

Holotype.—Male, Cat. No. 40726, U.S.N.M., Rosser, Tex., June 28, 1905 (C. R. Jones).

Paratypes.—Male, Dallas, Tex. (Boll); 4 males, Rosser, Tex., June 28, 1905 (C. R. Jones); 2 males, Rosser, Tex., July 6, 1905 (C. R. Jones); male, Rosser, Tex., July 6, 1905 (F. C. Bishopp); male, Rosser, Tex., July 6, 1905; in collections of United States National Museum, the University of Minnesota, the American Entomological Society of Philadelphia, and the author.

In some of the paratypes the pubescence of the pronotum is black rather than golden yellow. The specimens vary in length from 13 to 19 mm.

47. DASYMUTILLA MELANIPPE, new species

Female.—Head and thorax black, abdomen above red; length, 15 mm. Head black, clothed with long, coarse, erect, and semierect black hairs; mandibles acute at the tip; clypeus concealed by long hairs; scape clothed with stiff hairs; first segment of flagellum short, about one and one-half times as long as it is broad at the apex; antennal scrobes carinate above; front and vertex coarsely and confluently punctured; genae moderately, confluently punctate, much less coarsely sculptured than the front and vertex, without any indication of a longitudinal carina; relative length of head and thorax, 8–11.

Thorax black, longer than broad; dorsum coarsely and deeply reticulate, clothed with long, coarse, erect and semierect black hairs; propleura coarsely punctate at the margins, impunctate medially; mesopleura coarsely punctate throughout, the punctures scattered on the cephalic third, very close on the caudal two-thirds, a longitudinal row of long, black hairs on the elevated portion of the sclerite; metapleura coarsely punctate on the ventral third, a few scattered punctures on the dorsal two-thirds; sides of propodeum coarsely punctate, becoming coarsely reticulate on the dorsal and caudal margins; posterior face of the propodeum coarsely reticulate.

Abdomen black; first tergite short, coarsely punctured at the base and apex and with long, black hairs on the punctate areas; second tergite with very large, sparse shallow punctures on the lateral margins, coarsely reticulato-punctate on the disk, with rather sparse, golden recumbent and erect hairs on the lateral and extreme basal margins; tergites 3–5 with recumbent and erect golden hairs similar to those on the disk of tergite 2; pygidium coarsely, longitudinally striate throughout; second sternite coarsely punctured, the punctures scattered on the disk, close at the sides; sternites 3–5 very closely and confluently punctured, the punctures smaller than on sternite 2; all the sternites with a fringe of black hair on the apical margins.

Legs black, clothed with long black hairs.

Holotype.—Female, Cat. No. 40727, U.S.N.M., Victoria, Tex., August 28 (A. W. Morrill).

Paratypes.—Female, Gillette, Tex., Karnes County, July 25, 1917; female, Texas, in collections of J. Bequaert and the American Entomological Society of Philadelphia.

In color and superficial appearance this species is much like *gorgon*, *klugii*, *magnifica*, and *nogalensis*. It may be distinguished from *gorgon* by the following characters: head narrower than the thorax, antennal scrobes carinate above (in *gorgon* the head is as wide or wider than the thorax and the antennal scrobes are not carinate above); from *klugii* as follows: genae not as coarsely punctate as the front and vertex and without any indication of a longitudinal carina (in *klugii* the genae are sculptured the same as the front and vertex and there is an obscure longitudinal carina on the genae); from *magnifica* by the same characters as *klugii*, and the black apical fringes of the abdominal sternites (in *magnifica* there is a prominent, longitudinal carina on the genae and the abdominal sternites have apical fringes of reddish hairs); from *nogalensis* as follows: first segment of flagellum short, not more than one and one-half times longer than it is wide at the apex, abdomen black, sternites with apical fringes of black pubescence, and hind femora simple not truncate at the apex and truncations sulcate (in *nogalensis* the first segment of the flagellum is more than twice as long as it is broad at the apex, the abdomen is red, the sternites clothed with reddish pubescence, and the hind femora are squarely truncate at the apex, the surface of the truncations sulcate).

48. DASYMUTILLA MELANIPPE var. CONFORMIS, new variety

Female.—Dark mahogany red, clothed with black pubescence, except the vertex, dorsum of thorax, dorsum of propodeum, and dorsum of abdomen clothed with orange rufous pubescence. Length, 16 mm.

This variety is identical with *melanippe* in structure and sculpture; it differs, however, in having the vertex, dorsum of thorax and dorsum of propodeum clothed like the dorsum of the abdomen with orange rufous pubescence.

Holotype.—Female, Cat. No. 40728, Victoria, Tex., June 24, 1909 (J. D. Mitchell).

Paratype.—Female, Fedor, Tex., in collection of Cornell University.

49. DASYMUTILLA LAUTA, new species

Female.—Body very dark red, almost black; head and thorax sparsely clothed with black hairs, abdomen with yellowish hairs. Length, 9 mm.

Head very dark red, almost black, sparsely clothed with long, erect, and semierect black hairs; mandibles acute at the apex, a faint tooth within; clypeus concealed by long, black hairs; scape shining, scatteringly punctate, each puncture bearing a coarse hair; first segment of flagellum distinctly shorter than the length of segments two and three united; antennal scrobes not carinate; front and vertex moderately, closely, confluently punctate; genae shining, with moderate, well-separated punctures; relative width of head and thorax, 5.5–6.

Thorax very dark red; dorsum coarsely rugoso-reticulate, sparsely clothed with erect and recumbent black hairs; propleura with large, more or less confluent punctures; mesopleura with large punctures, separated on the anterior half, confluent on the posterior half; metapleura shining, the ventral half with large punctures, the dorsal half impunctate; sides of propodeum with large punctures, becoming reticulate at the caudal margin; posterior face of the propodeum deeply reticulate on the dorsal two-thirds, transversely rugoso-punctate on the ventral third; scutellar scales evident.

Abdomen very dark red; first tergite with scattered, large punctures, sparsely clothed with long, black hairs; second tergite moderately punctured, clothed with long, erect and recumbent, yellow hairs, except at the sides basally with black hairs; tergites 3–5 clothed with long, erect and recumbent, yellow hairs; pygidium longitudinally striate; sternite two shining, with large, well-separated punctures and very sparse, erect, black hairs; sternites 3–5 with shallow punctures; sternites 3–5 all with a fringe of black hairs at the apical margin, the fringe with a few yellowish hairs laterally.

Legs very dark red, shining, very sparsely clothed with long, black hairs.

Holotype.—Female, Del Rio, Tex., June 22–27 (Wickham), in collection of American Museum of Natural History.

Paratypes.—6 females, Del Rio, Tex., June 22–27 (Wickham); female, Victoria, Tex., September 10, 1907 (J. D. Mitchell); female, Cuero, Tex., June 19 (Townsend). Paratypes in collections of American Museum of Natural History, University of Minnesota, United States National Museum, and the author.

Several of the paratypes have the apical fringes of the sternites broadly yellow at the sides, rather than very narrowly yellow as in the holotype. One paratype is much larger, length 11.5 mm., and has the integument almost black, although the reddish color is still apparent.

The general appearance of this species, the dark head and thorax with yellow abdomen, and its small size distinguish it at once. The absence of a carina on the antennal scrobes above separates it from all the other species of a like habitus, except *gorgon* and *leda.* The relative length of the first segment of the flagellum with the second and third segments distinguishes it from the two latter. In *lauta* the first segment is distinctly shorter than segments two and three united, while in *gorgon* and *leda* the first segment is equal in length to segments two and three united.

50. DASYMUTILLA SULCATULLA, new species

Female.—Very dark mahogany red, almost black, the front, vertex, dorsum of thorax, and second abdominal tergite clothed with appressed and erect, dense, golden yellow pubescence, the apical fringe of the second abdominal tergite, and tergites 3–5 clothed with pale golden pubescence; pygidium longitudinally striate; length, 13 mm.

Head very dark mahogany red; front and vertex clothed with long, appressed and erect, golden yellow pubescence; genae very sparsely clothed with dark pubescence; mandibles acute at the tip, unidentate within (about one-third the total length of the mandible, from the tip); anterior margin of the clypeus bidentate medially; anterior half of clypeus glabrous, impunctate, the posterior half densely, finely punctate, clothed with long, dark hairs forming a clypeal fringe; scape with indistinct moderate punctures; first segment of flagellum less than twice as long as it is wide at the apex; about equal in length, ventrally, to segments two and three united; segments 3–10 with a broad, deep, longitudinal groove dorsally, the grooves of adjoining segments interrupted by the articulation of the segments; antennal scrobes feebly carinate above, the carina extending about half way from the antennal tubercles to the margins of the eyes; front and vertex coarsely, more or less confluently punctate; genae moderately, contiguously punctate, not as coarsely sculptured as the front and vertex; relative widths of head and thorax, 7.75–9.25.

Thorax dark mahogany red, the integument of the dorsum somewhat lighter in color than the remainder of the thorax; dorsum foveately, more or less confluently punctate; scutellar scale broad, prominent; a transverse, sinuate carina immediately anterior to the scutellar scale; dorsal half of propodeum coarsely, deeply, foveately punctured, the ventral half, shallowly rugoso-punctate; dorsum of thorax, and dorsal half of propodeum clothed with dense, appressed and erect, golden yellow pubescence; ventral half of propodeum with very sparse, erect, dark hairs; propleura coarsely, contiguously punctate, clothed with sparse, erect, dark golden hairs; anterior third of mesopleura with small, distinct punctures, sparsely clothed with dark hairs, the posterior two-thirds coarsely, confluently punctate, sparsely clothed with long, erect, dark hairs; metapleura glabrous, impunctate, except scattered, large punctures on the ventral half, and large, coarse, contiguous punctures near the ventral margin; sides of propodeum punctate, the punctures at the anterior margin large and scattered, becoming coarse and confluent towards the posterior margin.

Abdomen black, except the integument of the disk of the second tergite yellow; first tergite impunctate except for coarse, contiguous punctures at the apical margin, clothed with long, sparse, erect, dark hairs, and a thick apical fringe of golden yellow hairs; base and sides of second tergite with large, coarse, more or less confluent punctures, the disk with moderate, contiguous punctures, not as coarsely sculptured as the base and sides; second tergite clothed with long, appressed and erect, golden yellow pubescence, very sparse at the sides, more dense on the disk, the apical fringe thick and concolorous with the pubescence of the tergite; tergites 3–5 with moderate, contiguous punctures, clothed with appressed and erect pale golden pubescence; pubescence at sides and base of pygidial area dark; pygidial area longitudinally striate; longitudinal carina of first sternite very prominent medially, the sternite punctate and sparsely clothed with long, erect, pale hairs; second sternite with large punctures, distinct medially, contiguous at the sides and apex, clothed with sparse, erect, pale hairs, and a thick apical fringe of pale golden pubescence; sternites 3–5 with moderate, contiguous punctures; sternites 3–4 sparsely clothed with erect, pale hairs, and each with an apical fringe of pale golden pubescence; apical fringe and pubescence of sternite 5 dark, almost black.

Legs dark mahogany red, sparsely clothed with long, dark hairs above, long, pale hairs below; calcaria black.

Holotype.—Female, Cat. No. 40730, U.S.N.M., Brewster County, Tex., Rio Grande, June 13–17, 1908 (Mitchell and Cushman).

Paratypes.—5 females, Brewster County, Tex., Rio Grande, June 13–17, 1908 (Mitchell and Cushman), in collection of United States National Museum and University of Minnesota.

This species resembles *bioculata* and its allies to some extent in form and vestiture, but differs in having the antennal scrobes feebly carinate above, and in having tergites 3–5 clothed entirely with pale golden pubescence. It also differs from any other species of this genus that I have seen in the character of the antennae. The longitudinal grooves of flagellar segments 3–10 are very characteristic. There is some question as to whether this is really a valid morphological character, or whether it is due to some factor in collecting the specimens. All of the specimens are alike in this, however, except one; five have the groove present on segments 3–10, while one has the groove present only on segments 5–10. If this character should prove to be a valid one, it will greatly facilitate the recognition of this species. It runs out in the key with *melanippe* and *flammifera*, from both of which it is quite distinct. The paratypes vary in length from 8.15 to 13 mm.

Group QUADRIGUTTATA

Females with the head narrower than the thorax; antennal scrobes not carinate above except in *cariniceps;* the postero-lateral angles of the head prominent, usually tuberculate; thorax long, subhexagonal, scutellar scale present; pygidium longitudinally striate; pubescence very sparse (except in *californica*). Males unknown.

51. DASYMUTILLA QUADRIGUTTATA (Say)

Mutilla quadriguttata Say, West. Quart. Rep., vol. 2, p. 74, 1823, female.—LeConte, "Writings of Thomas Say," vol. 1, p. 163, 1859, female.—Blake, Trans. Amer. Ent. Soc., vol. 7, p. 245, 1879, female.—Dalle Torre, Cat. Hymen., vol. 8, p. 76, 1897, female.—Fox, Trans. Amer. Ent. Soc., vol. 25, p. 239, 1899, female (part).—Melander, Trans Amer. Ent. Soc., vol. 29, p. 297, 1903, female (part).—Hayes, Bull. Brooklyn Ent. Soc., vol. 19, p. 153, 1924, female.

Mutilla (*Sphaerophthalma*) *quadriguttata* Blake, Trans. Amer. Ent. Soc., vol. 3, p. 246, 1871, female.

Sphaerophthalma quadriguttata Blake, Trans. Amer. Ent. Soc., vol. 13, p. 239, 1886, female (part).—Hart, Bull. Ill. Lab. Nat. Hist., vol. 7, p. 253, 1907, female.

Ephuta (Ephuta) quadriguttata André, Gen. Ins., vol. 1, fasc. 11, p. 63, 1903, female.

Dasymutilla quadriguttata Mickel, 19th Rept. State Ent. Minn., p. 105, 1923, female.

Type.—Destroyed.

Type locality.—Near Rocky Mountains.

Neotype.—Female, Halsey, Nebr., August 14, 1925 (R. W. Dawson), in collection of University of Minnesota.

Distribution.—Mississippi, Louisiana, Illinois, Iowa, Minnesota, South Dakota, Nebraska, Kansas, Oklahoma, and Texas. (Fig. 14.)

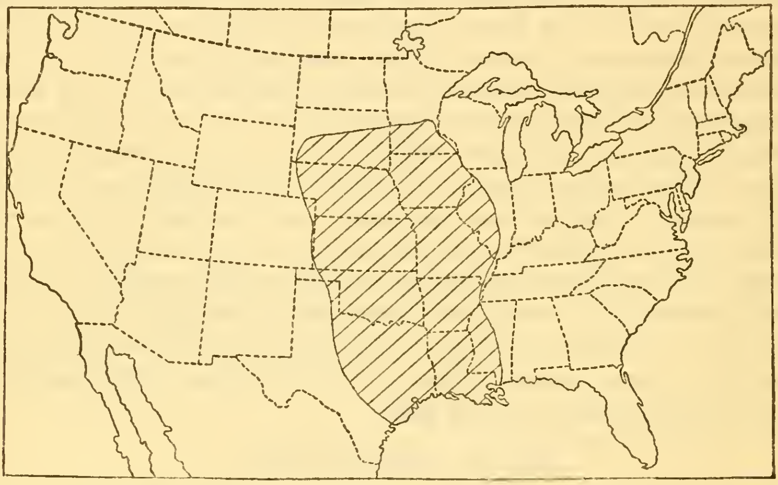

Fig. 14.—Distribution of Dasymutilla quadriguttata (Say)

SPECIMENS EXAMINED

Iowa: 2 females, Ames; female, Sioux City, July 29, 1921 (C. N. Ainslie).

Kansas: Female, Cherokee County, 1915 (R. H. Beamer); female, Neosho County; June 13, 1919 (Grace O. Wiley); female, Allen County, 1915 (R. H. Beamer); 3 females, Ottawa, July 18, 1923 (W. J. Brown); female, Wellsville, July 23, 1901; female, Wellsville, August 15, 1901; female, Douglas County, July 25, 1919 (W. E. Hoffmann); female, Lawrence, September 11, 1922 (W. E. Hoffmann); female, Geary County, May 25; female, Riley County, July 11 (Popenoe); 2 females, Riley County, July 12 (Popenoe); 2 females, Riley County, July 17 (Popenoe); 4 females, Riley County, July 19 (G. A. Dean); 2 females, Riley County, July 19 (Popenoe); 5 females, Riley County, July 21 (Popenoe); 3 females, Riley County, July 22 (Popenoe); 3 females, Riley County, July 24 (G. A. Dean); female, Riley County, July 25 (G. A. Dean); female, Riley County, July 26 (G. A. Dean); female, Riley County, July (Marlatt); female, Riley County, August 2 (G. A. Dean); female, Riley County, August 3 (G. A. Dean);

3 females, Riley County, August 8 (J. B. Norton); 2 females, Riley County, August 9 (Popenoe); 4 females, Riley County, August 12 (G. A. Dean); female, Riley County, August (Marlatt); female, Riley County, September 12 (Popenoe); female, Riley County, September (Marlatt); female, Riley County (Popenoe); female, Medora, September 27, 1912 (Horton); 2 females, Comanche County, 1916 (R. H. Beamer); female, Kiowa County, July 6, 1911 (F. X. Williams); female, Phillips County, August 30, 1912 (F. X. Williams); female, Norton County, August 24, 1912 (F. X. Williams); female, Decatur County (F. X. Williams); female, Clark County, August 23, 1911 (F. X. Williams); female, Stevens County, August 10, 1911 (F. X. Williams); female, Morton County, August 15, 1911 (F. X. Williams); female, Wallace County (F. X. Williams); 2 females, Sherman County (F. X. Williams); 2 females, Cheyenne County (F. X. Williams); 17 females.

LOUISIANA: Female.

MINNESOTA: 2 females La Crescent, July 13, 1922 (C. E. Mickel); female, Gray Cloud Island, August 5, 1896.

MISSISSIPPI: Female, Flora, August, 1916 (H. B. Greaves); female, Logtown, Summer, 1917 (A. Lutken).

NEBRASKA: Female, Plattsmouth, September 3, 1923 (C. B. Philip); female, Lincoln, June 24, 1920 (R. W. Dawson); 2 females, Lincoln, July 7, 1914 (C. E. Mickel); 4 females, Lincoln, July 11, 1920 (C. E. Mickel); 2 females, Lincoln, July 18, 1920 (R. W. Dawson); 2 females, Lincoln, August 24, 1916 (C. E. Mickel); female, Lincoln, August 24, 1916 (M. H. Swenk); female, Lincoln, August; female, Lincoln, September 8, 1924 (R. W. Dawson); female, Lincoln, September 9, 1917 (R. W. Dawson); female, Lincoln, September 9, 1924 (R. W. Dawson); female, Lincoln, September; female, Lincoln (Shimek); 2 females, Halsey, August 9, 1925 (R. W. Dawson); 2 females, Halsey, August 12, 1925 (R. W. Dawson); female, Halsey, August 13, 1920 (C. B. Philip); female, Halsey, August 14, 1925 (R. W. Dawson); 2 females, Halsey, August 15, 1925 (R. W. Dawson); female, Halsey, August 23, 1911 (J. T. Zimmer); female, Halsey, August 24, 1911 (J. T. Zimmer); 2 females, Halsey, August 29, 1924 (R. W. Dawson); female, Halsey, August 30, 1924 (R. W. Dawson); female, Halsey, September 1, 1924 (R. W. Dawson); 7 females, Halsey, September 3, 1924 (R. W. Dawson); female, McCook, August 13, 1909 (C. H. Gable); female, McCook, August 9, 1901 (M. A. Carriker, Jr.); female, Haigler, August 19, 1909 (C. H. Gable); female, Scottsbluff, August 5, 1923 (Leonard Worley).

OKLAHOMA: Female, Arkansas River, sand bottoms, Osage Nation side, October 7, 1906 (A. G. Burrel).

SOUTH DAKOTA: Female, Springfield, September 7, 1924 (H. C. Severin); female, Fort Pierre, August 9, 1924.

TEXAS: Female, Beaumont, August, 1918, (G. E. Riley); female, Richmond, May 29, 1918 (J. C. Bradley); 2 females, Richmond, June 22, 1917; female, Wharton, July 5 (A. McLaughlin); female, Fedor, Lee County, May; female, Lee County, September 11, 1905; female, Lee County, September, 1908; female, Jacksonville, June 5, 1919 (Paddock); female, Overton, August 22 (W. W. Yothers); female, Mineola, July 19 (F. C. Bishopp); female, Sherman, September 10, 1910 (F. C. Bishopp); female, June, 1918 (R. M. Rosa); female.

This species has been reared by Hayes (1924) from the cocoons of *Elis quinquecincta* Fabricus. Hayes also reared a male Mutillid

Dasymutilla permista Mickel from a cocoon of *Elis quinquecincta* Fabricius several years later. Is is possible that *permista* may be the male of *quadriguttata* but it does not seem probable inasmuch as *quadriguttata* does not occur east of Minnesota, Illinois, and Mississippi, while *permista* occurs east to the Atlantic coast. If *permista* should prove to be the male of *quadriguttata*, the latter must be represented in the east by some female closely related to it. Such a species is *interrupta.* What the real relationships of *quadriguttata*, *permista* and *interrupta* are, remains to be determined and until these relationships are definitely known it is best to regard each as a single species. The specimens of *quadriguttata* at hand vary in length from 7 mm. to 15 mm.

52. DASYMUTILLA INTERRUPTA Banks

Mutilla cypris Fox, Trans. Amer, Ent Soc., vol. 25, p. 240, 1899, female (in part).—Melander, Trans. Amer. Ent. Soc., vol. 29, p. 299, 1903, female.

Sphaerophthalma cypris Howard, The Insect Book, pl. 8, fig. 7, 1905, female.

Dasymutilla (*Dasymutilla*) *cypris* Bradley, Trans. Amer. Ent. Soc., vol. 42, p. 326, 1916, female (part).

Dasymutilla cypris Rohwer, Hymen. of Conn., Bull. 22, Conn. Geol. Nat. Hist. Surv., p. 622, 1916, female.—Banks, Ann. Ent. Soc. Amer., vol. 14, p. 25, 1921, female.—Mickel, 19th Rept. State Ent. Minn., p. 105, 1923, female.

Mutilla (*Sphaerophthalma*) *mutata* Washburn, 17th Rept. State Ent. Minn., p. 209, 1918, female.

Dasymutilla cypris var. *interrupta* Banks, Ann. Ent. Soc. Amer., vol. 14, p. 24, 1921, female.

Dasymutilla mutata Banks, Ann. Ent. Soc. Amer., vol. 14, p. 26, 1921, female.

This species has been identified in all collections as *cypris* but an examination of the type of the latter has shown that the name *cypris* should apply to the specimens which have been described by Rohwer as *mutata miamensis* and by Bradley as *rubicunda.*

The description of this species is as follows:

Female.—Ferruginous, very sparsely clothed above with recumbent, golden yellow pubescence; the second abdominal tergite sparsely clothed with black, recumbent pubescence except a pair of small, basal, pale ferruginous spots and a pair of large, apical, pale ferruginous spots with golden yellow pubescence; apical fringes of abdominal tergites 2–5, and pubescence of body at sides and beneath, silvery gray; postero-lateral angles of head, each with an oblique, subrectangular, glabrous tubercle; posterior margin of head slightly convex; pygidium longitudinally striate, the striae continuous to the apical margin; length, 9 mm.

Head ferruginous; front and vertex very sparsely clothed with recumbent, golden yellow pubescence, and a few scattered, erect hairs; the genae with sparse, erect, silvery gray pubescence; mandibles acute at the apex, not dentate within; clypeus with a median, transverse, very sharp, sinuate carina, the cephalic half of the clypeus glabrous, impunctate, the caudal half densely, finely, confluently punctate; scape finely punctate beneath, coarsely, contiguously punctate above; first segment of flagellum slightly less than twice as long as it is broad at the apex, shorter than the length of segments 2 and 3 united; antennal scrobes not carinate above; front with dense, deep, somewhat confluent punctures; vertex and genae with somewhat similar punctures, but the latter not so deep and coarse as on the front; posterolateral angles of head with an oblique, elongate, subrectangular, glabrous tubercle, the tubercles connected caudally by a carina on the posterior margin of the vertex, posterior margin of head slightly convex; relative widths of head and thorax, 5.75–6.

Thorax ferruginous, clothed above with sparse, recumbent, golden yellow pubescence, and a few scattered, erect hairs; sides of thorax with very sparse, silvery gray pubescence; dorsum of thorax with very coarse, dense, deep, somewhat confluent punctures; scutellar scale present; a broken, somewhat indistinct, sinuate carina immediately anterior to the scutellar scale; propleura with large, coarse punctures at the margins, intermixed with fine punctures on the disk; anterior two-thirds of mesopleura finely, closely punctured, the posterior third with large, close punctures; metapleura glabrous, with sparse, indistinct fine punctures, interspersed ventrally with scattered, large punctures; sides of propodeum with large, shallow, almost contiguous punctures; dorsal half of posterior face, and dorsum of propodeum very coarsely, deeply, confluently punctate; ventral half of posterior face of propodeum finely punctate, interspersed with large, scattered punctures.

Abdomen ferruginous; first segment short, subsessile with the second; first tergite finely punctate, interspersed with scattered, large punctures, clothed with sparse, erect, silvery gray pubescence, the apical fringe black; second tergite with a pair of small, basal and a pair of large apical, pale ferruginous spots, the spots with sparse, recumbent, golden yellow pubescence, remainder of tergite with sparse, recumbent, black pubescence, except the apical fringe silvery gray; second tergite with large, dense, deep, somewhat confluent punctures, the puncturation denser and coarser on the disk than at the lateral and basal margins; third tergite with large, dense, somewhat confluent punctures, clothed with sparse, recumbent, black pubescence, except the apical fringe silvery gray; tergites 4 and 5 densely punctate, clothed with sparse, recumbent, silvery gray pubescence; pygidium longitudinally striate, the striae continuous to the apical margin; first sternite carinate medially but the carina not prominent nor dentate; second sternite with large, very sparse, distinct punctures, densely punctate at the apical margin; sternites 3–5 densely punctate at the apical margin; sternites 2–5 with the apical fringes silvery gray.

Legs ferruginous, sparsely clothed with silvery gray pubescence; calcaria ferruginous.

Type.—Female, Falls Church, Virginia, July, in collection of Museum of Comparative Zoölogy, Cambridge, Massachusetts.

Plesiotype.—Female, Cold Springs Harbor, L. I., June 17, 1923 (E. G. Anderson), in collection of University of Minnesota.

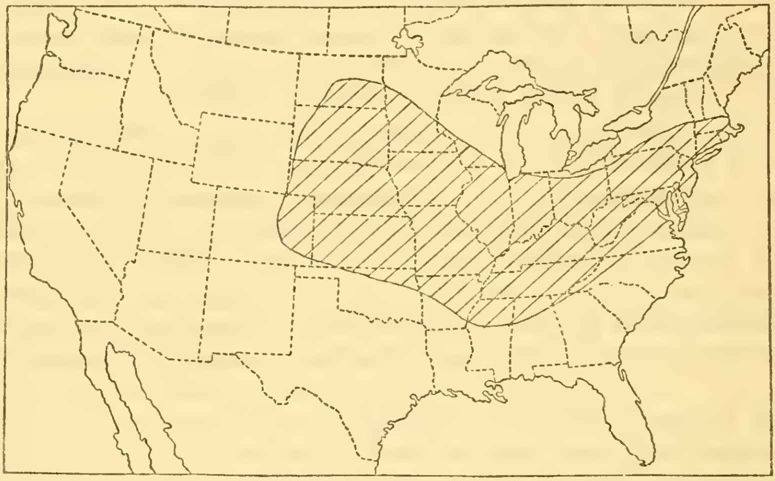

FIG. 15.—DISTRIBUTION OF DASYMUTILLA INTERRUPTA BANKS

Distribution.—Massachusetts, Connecticut, New York, Pennsylvania, New Jersey, Maryland, Virginia, Mississippi, Illinois, Indiana, Missouri, Iowa, Minnesota, North Dakota, South Dakota, Nebraska, Kansas and Colorado. (Fig. 15.)

SPECIMENS EXAMINED

COLORADO: Female, Colorado Springs, June 15–30, 1896 (H. F. Wickham); female, Colorado Springs (W. M. Wheeler); female, Boulder Canyon, 1916 (Paul Blanchard and Nat Dodge).

ILLINOIS: Female, Bloomington, July 26, 1909; female, Bloomington, August 20, 1909; female, Bloomington, August 25, 1909; female, Bloomington, August 26, 1909; female, Bloomington, August 30, 1909; 2 females, Bloomington, September 2, 1909; female, Urbana, August 28, 1898; female, Galesburg; female, Aurora, June 28, 1909; female, McHenry, August, 1903.

INDIANA: Female, Lafayette, July 30, 1922 (J. J. Davis).

IOWA: Female, Ames, May 8, 1897; female, Ames, May 15, 1897; female, Ames, June 5, 1897; female, Ames, September 3, 1896; female, Ames, September 14, 1892; female, Ames; female, Sioux City, July 12, 1924 (C. N. Ainslie); female, Sioux City, July 15, 1920 (C. N. Ainslie); female, Sioux City, July 15, 1922 (C. N. Ainslie); female, Sioux City, July 16, 1921 (C. N. Ainslie); 2 females, Sioux City, July 19, 1924 (C. N. Ainslie); female, Sioux City, July 20, 1921 (C. N. Ainslie); female. Sioux City, July 27, 1923 (C. N. Ainslie); 2 females, Sioux City, July 30, 1921 (C. N. Ainslie); female, Sioux City, August 20, 1918 (C. N. Ainslie); female, Sioux City, August 21, 1920 (C. N. Ainslie); 3 females, Sioux City, August 26, 1920 (C. N. Ainslie); 2 females, Sioux City, August 27, 1920 (C. N. Ainslie); 14 females, Sioux City, September 7, 1920 (C. N. Ainslie); 2 females, Sioux City, September 17, 1921 (C. N. Ainslie); female, Iowa City, August 4, 1898 (H. F. Wickham); 2 females, Iowa City (Wickham).

KANSAS: Female, Cherokee County, 1915 (R. H. Beamer); female, Wellsville, August 19, 1901; female, Douglas County, October 14, 1921 (W. J. Brown); female, Riley County, May (Popenoe); female, Riley County, May (Marlatt); 2 females, Riley County, June 26 (G. A. Dean); female, Riley County, July 10 (Popenoe); female, Riley County, July 11 (Popenoe); female, Riley County, July 12 (Popenoe); 2 females, Riley County, July 18 (G. A. Dean); female, Riley County (Marlatt); female, Russell County, August 26, 1912 (F. X. Williams); female, Clark County, June (F. H. Show); female, Clark County, August 23, 1911 (F. X. Williams); female, Phillips County, August 30, 1912 (F. X. Williams); female, Sheridan County (F. X. Williams); female, Rawlins County (F. X. Williams); 23 females (T. B. A.); female.

MARYLAND: Female, Odenton, July 16, 1918 (H. Dietrich); female, Odenton, July 28, 1916 (H. Dietrich); female, Chestertown, August 6, 1902.

MINNESOTA: Female, Rochester, June 14, 1922 (C. E. Mickel); 3 females, Olmstead County (C. N. Ainslie); 2 females, St. Peter, August 11, 1923 (Sam Kepperley); female, Jordan, July 15, 1923 (A. T. Hertig); female, Jordan, July 15, 1923 (C. E. Mickel); 3 females, Jordan, August 1, 1922 (A. T. Hertig); 2 females, Barden sand dunes, Scott County, July 29, 1923 (R. W. Dawson); 4 females, Gray Cloud Island, August 5, 1896; 2 females, Gray Cloud Island, August 20, 1898; 2 females, Fort Snelling, July 27, 1922 (C. E. Mickel); female, St. Anthony Park, Ramsey County, June 5, 1911; female, St. Anthony Park, Ramsey County, July 30, 1924 (H. H. Knight); female, St. Anthony Park, Ramsey County, August 7, 1922 (A. T. Hertig); female, Fridley sand dunes, Anoka County, May 29, 1923 (C. E. Mickel); female, Fridley sand dunes, Anoka County, June 24, 1923 (C. E. Mickel); female, Fridley sand dunes, Anoka County, June 25, 1923 (R. W. Dawson); female, Fridley sand dunes, Anoka County, July 12, 1923 (C. E. Mickel); female, Fridley sand dunes, Anoka County, July 14, 1923 (C. E. Mickel); female, Fridley sand dunes, Anoka County, July 19, 1923 (C. E. Mickel); 10 females, Fridley sand dunes, Anoka County, July 21, 1922 (C. E. Mickel); female, Fridley sand dunes, Anoka County, July 24, 1922 (Paul Gilmer); 16 females, Fridley sand dunes, Anoka County, July 24, 1923 (C. E. Mickel); 3 females, Fridley sand dunes, Anoka County, July 26, 1923 (R. W. Dawson); 5 females, Fridley sand dunes, Anoka County, July 28, 1922 (Paul Gilmer); 6 females, Fridley sand dunes, Anoka County, July 28, 1922 (C. E. Mickel); 15 females, Fridley sand dunes, Anoka County, August 8, 1922 (A. T. Hertig); 21 females. Fridley sand dunes, Anoka County, August 8, 1922 (C. W. Johnson).

MISSISSIPPI: Female, Hinchcliff, October 3, 1916.

MISSOURI: Female, St. Louis (P. Rau); female, Kansas City (F. Rogers).

NEBRASKA: Female, Omaha, July 18, 1913 (L. T. Williams); 6 females, Plattsmouth, September 3, 1923 (C. B. Philip); female, Louisville, July 5, 1915 (E. G. Anderson); female, South Bend, May 25, 1910 (L. Bruner); female, South Bend, July 14, 1915 (E. M. Partridge); female, Lincoln, May 16, 1908; 4 females, Lincoln, June 11, 1920 (C. E. Mickel); female, Lincoln, July 18, 1920 (R. W. Dawson); female, Lincoln, August 19, 1915; (L. M. Gates); female, Lincoln, September 18, 1914 (C. E. Mickel); female, Lincoln, July; 2 females, Maskell, Dixon County, July 16, 1915 (E. G. Anderson); female, Fairmont, July 27, 1912 (G. W. Deming); female, Fairmont, August 10, 1912 (G. W. Deming); female, West Point, June, 1887; female, West Point, July, 1888; 3 females, West Point; female, Red Cloud, June 18, 1913 (R. W. Dawson); female, Broken Bow (F. Rogers); female, Dismal River, July; 2 females, Sand Hills, July; 2 females, Sand Hills, September; female, Halsey, June; female, Halsey, August 15, 1925 (R. W. Dawson); female, Halsey, August 16, 1925 (R. W. Dawson); female, Halsey, August 31, 1924 (R. W. Dawson); female, Halsey, September 3, 1924 (R. W. Dawson); 2 females, Ogallala, June 24, 1913 (R. W. Dawson); female, Imperial, June 22, 1913 (R. W. Dawson); female, Scottsbluff, August 5, 1923 (Leonard Worley).

NEW JERSEY: Female, Cape May, September (H. Skinner); female, Clementon, May 30, 1897; female, Boonton, September 10, 1891; female, Ramsey; female, September 29, 1889; female.

NEW YORK: Female, Fishers Island, August, 1877; female, Cold Springs Harbor, L. I., June 29, 1921 (E. G. Anderson); 2 females, Yaphank, August 27, 1916 (Wm. T. Davis); female, Bellport, L. I.; female, Wading River, L. I.; female, Quogue, Long Island, August 12, 1906.

NORTH DAKOTA: Female, Cannon Ball, August 20, 1922 (O. A. Stevens).

PENNSYLVANIA: Female, Millersburg, July 31, 1911; female, Rockville, August 5.

SOUTH DAKOTA: Female, Springfield, June 13, 1925 (H. C. Severin); female, Brookings, June 6 (H. C. Severin); female, Brookings, June 18 (H. C. Severin); female, Ravinia, August 10, 1922 (C. N. Ainslie); female, Chamberlain, August 31, 1923 (H. C. Severin); female, Freeman, August 11, 1923 (H. C. Severin); female, Martin, June 16, 1925 (H. C. Severin); female, Martin, September 12, 1925 (H. C. Severin); female, Hot Springs, July 8, 1924; 3 females.

VIRGINIA: Female, Falls Church, September 1, 1915 (C. T. Greene)

This is a common species throughout its range. At the Fridley sand dunes, north of Minneapolis, Minn., it is fairly abundant, although exceeded in numbers by two or three other species. It is closely related to *quadriguttata* Say and may ultimately prove to be a subdivision of that species (see discussion under *quadriguttata*). It differs from the latter by having the postero-lateral tubercules more prominent and more widely separated, and in the coloration and maculation of the abdomen. The specimens vary in length from

5.5 mm. to 12 mm. The specimens at hand show slight variations in intensity of coloration. Banks described this species originally as a variety of *cypris* (Blake), but his type is cospecific with the material placed here, and thus *interrupta* becomes the valid name of the species. An examination of the type of *interrupta* has shown that it does not correspond in all respects with the plesiotype, from which the above description was drawn, but the points of difference are slight and appear to be well within the limits of individual variation. I have therefore not designated these variants with varietal names.

53. DASYMUTILLA CYPRIS (Blake)

Mutilla cypris Blake, Trans. Amer. Ent. Soc., vol. 3, p. 246, 1871, female; Trans. Amer. Ent. Soc., vol. 7, p. 245, 1879, female.—Dalle Torre, Cat. Hymen., vol. 8, p. 29, 1897, female.—Fox, Trans. Amer. Ent. Soc., vol. 25, p. 240, 1899, female.

Mutilla mutata Blake, Trans. Amer. Ent. Soc., vol. 3, p. 247, 1871, female; Trans. Amer. Ent. Soc., vol. 7, p. 245, 1879, female.—Dalle Torre, Cat. Hymen., vol. 8, p. 65, 1897, female.

Sphaerophthalma cypris Blake, Trans. Amer. Ent. Soc., vol. 13, p. 239, 1886, female.

Sphaerophthalma mutata Blake, Trans. Amer. Ent. Soc., vol. 13, p. 241, 1886, female.

Ephuta (Ephuta) cypris André, Gen. Ins., vol. 1, fasc. 11, p. 59, 1903, female.

Dasymutilla mutata miamensis Rohwer, Proc. U. S. Nat. Mus., vol. 41, p. 462, 1912, female.

Dasymutilla (Dasymutilla) rubicunda Bradley, Trans. Amer. Ent. Soc., vol. 42, p. 325, 1916, female.

Dasymutilla rubicunda Banks, Ann. Ent. Soc. Amer., vol. 14, p. 25, 1921 female.

Type.—Female, Georgia, in collection of the American Entomological Society of Philadelphia. The type of *mutata* is in the collection of the American Entomological Society of Philadelphia. The type of *mutata miamensis* is in the United States National Museum. The type of *rubicunda* is in the collection of Cornell University.

Distribution.—New Jersey, West Virginia, Georgia, Florida, and Mississippi. (Fig. 16.)

SPECIMENS EXAMINED

Florida: Female, Miami, March 3 (D. M. Delong); female, Gulfport, June (Reynolds); female, Gulfport, September (Reynolds); female, Titusville, November 8, 1911; female, Orlando, May 13, 1925 (O. C. McBride); female, Fort Reed, April 14, 1886; female, Fort Reed, April 22, 1886; female, Enterprise, April 20 (D. M. Castle); female, Ocala, October 24, 1919; female, Gainesville, March 19, 1922; female, Gainesville, March 24, 1923;

female, Gainesville, May 10, 1922 (T. P. Winter); female, Gainesville, May 20, 1914; female, Gainesville; female, Pablo Beach, August 12, 1905 (Hebard and Rehn); 2 females, DeFuniak Springs, October 17–19, 1914; female, La Belle, May 8–10, 1916 (J. C. Bradley); female, Sannibel Island, May 13, 1916 (J. C. Bradley); 3 females, Pensacola, October 11–14, 1914.

GEORGIA: 7 females, Spring Creek, Decatur county, May 18–21, 1916 (J. C. Bradley); female, Spring Creek, Decatur county, June 7–23, 1911 (J. C. Bradley); 4 females, Spring Creek, Decatur county, July 16–29, 1912; female, Spring Creek, Decatur county, September 23–October 3, 1910 (J. C. Bradley); female, Spring Creek, Decatur county; 2 females, Billy's Island, Okefenokee Swamp, September 1–5, 1913; female, St. Simon's Island, June 9, 1911; female, Demorest, September 10, 1921; female.

MISSISSIPPI: Female, Ocean Springs, June, 1915 (F. F. Bibby).

NEW JERSEY: Female, Gloucester County, October 4, 1903 (F. Haimbach), 2 females, Westville, August 19, 1897; female, Wenonah, June 14, 1904; female, Cassville, August 17, 1910; female, Lucaston, September 3, 1906.

WEST VIRGINIA: Female, Millville (J. C. Bradley).

The types of *cypris*, *mutata*, *miamensis*, and *rubicunda* have been examined and found to be identical. *Cypris* is a relative of *interrupta* and *allardi* but is distinguished from both by the posterior margin of the head which is slightly concave rather than distinctly convex. The apical fringes of tergites two and three are interrupted medially with black; the striae in most specimens do not quite reach the tip, leaving a very narrow, smooth, unsculptured border. The specimens vary in length from 6.5 mm. to 13 mm.

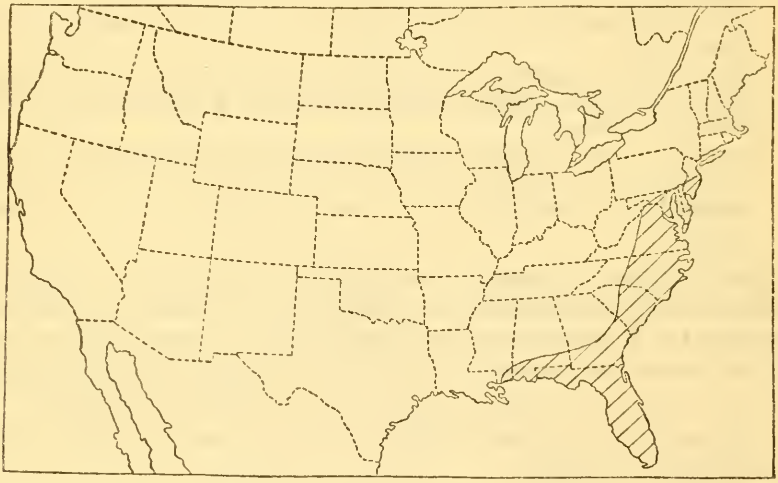

FIG. 16.—DISTRIBUTION OF DASYMUTILLA CYPRIS (BLAKE)

54. DASYMUTILLA ALLARDI Rohwer

Dasymutilla allardi ROHWER, Proc. U. S. Nat. Mus., vol. 41, p. 463, 1912, female.—BANKS, Ann. Ent. Soc. Amer., vol. 14, p. 25, 1921, female.—RAU, Trans. Acad. Sci., St. Louis, vol. 24, p. 6, 1922, female.

Dasymutilla (*Dasymutilla*) *cypris* Bradley, Trans. Amer. Ent. Soc., vol. 42, p. 326, 1916, female (part).

Type.—Female, Thompsons Mills, Georgia, October, 1909 (H. A. Allard), in collection of United States National Museum.

Distribution.—New York, New Jersey, Maryland, Virginia, North Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, Missouri, Texas, and Oklahoma. (Fig. 17.)

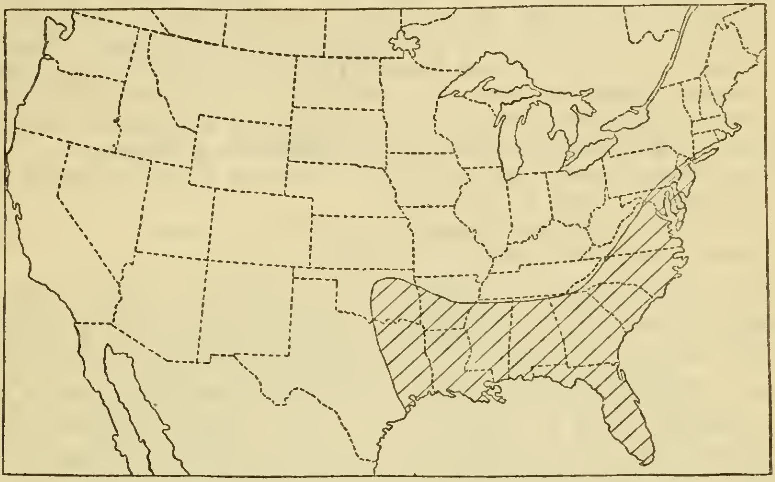

Fig. 17.—Distribution of Dasymutilla allardi Rohwer

SPECIMENS EXAMINED

Alabama: Female, Thomasville, June 11, 1917 (H. H. Knight).

Florida: Female, Miami, April 12 (J. N. Knull); female, Orlando, June 8, 1914 (G. G. Ainslie); female, Enterprise, April 30 (D. M. Castle); female, Gainesville, May 4, 1922 (T. P. Winter); female, Gainesville, May 5, 1922 (T. P. Winter); female, Gainesville, September 26–October 2, 1914; female, Jacksonville, November 3, 1911; female, Jacksonville, November 5, 1911; 3 females, Lake Jackson, Leon County, June 22, 1922 (J. B. Alexander); female, LaBelle, May 8–10, 1916 (J. C. Bradley); 2 females, Pensacola, October 11–14, 1914.

Georgia: Female, Bainbridge, June 2, 1911 (J. C. Bradley); female, Spring Creek, Decatur County, June 7–23, 1911 (J. C. Bradley); female, Spring Creek, Decatur County, July 16–29, 1912; female, St. Simon's Island, June 8, 1911; female, Austell, August 27, 1910; female, Stone Mountain, September 9, 1910; female, Talluloh Falls, August 5, 1909; female, Sandfly, Savannah, July 13–14, 1916; 3 females.

Louisiana: Female, Many, August 23, 1906 (F. C. Bishopp); female, Natchitoches, August 13, 1910 (H. Pinkus).

Maryland: Female, Chestertown, August 9, 1902; female, Chestertown, August 19, 1900; female, Chestertown, August 19, 1899 (E. G. Vanatta); female.

MISSISSIPPI: Female, Louisville, July, 1917 (J. F. Atkinson); female, Agricultural College, April 20, 1920 (M. R. French); female, Agricultural College, May 3, 1922 (L. R. Pylant).

NEW JERSEY: Female, Manumuskin, August 17, 1902 (E. Daecke); female, Westville, August 28, 1897; female, North Woodbury, August 11, 1901; female, Almoresson; female, Charsworth, July 11, 1911 (W. T. Davis); female, Mount Holly, August 19, 1906; female, Lakehurst, August 18; female, Clementon, June 2, 1901; female, Lahaway, September 14.

NEW YORK: Female, Yaphank, Long Island, July 12.

NORTH CAROLINA: Female, Southern Pines, June 24, 1909; female, Southern Pines, August 1, 1907 (A. H. Manee); female, Southern Pines, August 5, 1918; female, Southern Pines, August 8, 1918; female, Southern Pines, August, 1907; female, Raleigh, July 2, 1903 (F. Sherman); female, Raleigh, August 15, 1904 (C. S. Brimley); female, Statesville, May 31, 1917 (R. W. Leiby); female, Oakdale, August 22, 1902 (F. Sherman, jr.).

OKLAHOMA: 2 females, Payne county, June 2, 1925 (W. J. Brown).

TEXAS: Female, Mineola, July 19, 1906 (Bishopp and Jones); female, Rosser, September 23, 1905 (C. R. Jones).

VIRGINIA: Female, Wingina, August 1, 1916 (W. T. Davis); female, Falls Church, September 1, 1915 (C. T. Greene).

The convex posterior margin of the head and less prominent postero-lateral tubercles distinguish this species from *cypris* (Blake). It is possible that ultimately this species may be shown to be the same as *cypris* but in the light of present knowledge it seems best to recognize it as a distinct form. It is easily separated from *interrupta* by two characteristics; the striae of the pygidium do not extend to the apex, leaving the apical one-third or one-fourth smooth, and the apical fringes of the second and third tergites are interrupted medially by black hairs. A specimen in the collection of Nathan Banks, taken at Southern Pines, N. C., August, 1907, is accompanied by a male of *agenor* Fox. *Allardi* can not be the female of *agenor* Fox because the latter is the male of *vesta* Cresson and the two are certainly not the same. A second specimen from Southern Pines, N. C., August 1, 1907, is accompanied by a male of *rubricosa*. There is a possibility of the latter being the male of this species but the evidence is not certain enough to unite the two. The specimens vary in length from 8 to 12 mm. Material studied agrees with Rohwer's type which has been examined by the author.

55. DASYMUTILLA ALESIA Banks

Dasymutilla alesia BANKS, Ann. Ent. Soc. Amer., vol. 14, p. 24, 1921, female.

Type.—Female, Falls Church, Va., in collection of Museum of Comparative Zoology.

Distribution.—New York, Maryland, Virginia, West Virginia, North Carolina, Tennessee, and Mississippi.

SPECIMENS EXAMINED

Maryland: Female, Plummer Island, July 4, 1921.

Mississippi: Female, Agricultural College, March 29, 1915 (F. E. Lee); female, Agricultural College, May 18, 1921 (J. A. Harris); female, Agricultural College, June 5, 1922 (J. M. Wallace); female, Forkville, July, 1916 (Jas. H. Price).

New York: Female, Yaphank, August 29, 1916 (W. T. Davis).

North Carolina: Female, Raleigh, April.

Tennessee: Female, Allardt, Fentress county, August 19, 1922 (T. H. Hubbell).

Virginia: Female, Falls Church, August 20, 1913 (C. T. Greene); female, Veitch, September 23, 1913 (C. T. Greene).

West Virginia: Female, Wirt county.

Easily distinguished by the conspicuous, sharply defined spots of the second tergite and the black apical fringes of the first, second and third tergite.

56. DASYMUTILLA ATRIFIMBRIATA, new species

Female.—Head and thorax ferruginous, the abdomen black; the second tergite maculated with two small basal and two large apical pale spots. Much like *quadriguttata* Say but the apical fringes of the first, second and third tergites black. Length, 10 mm.

Head ferruginous; the front and vertex clothed with sparse, recumbent, golden pubescence and a few scattered, long, erect hairs; the scape and genae with sparse, recumbent silvery pubescence; mandibles acute at the apex, unidentate within on the inner margin; cephalic face of clypeus glabrous, impunctate, the caudal half very finely and closely punctate medially; clypeal fringe of long, dark golden hairs; scape very closely punctate; first joint of flagellum about one and one-half times as long as it is broad at the apex; antennal scrobes not defined by a carina above; front coarsely, confluently punctate; vertex closely punctate but not as coarsely sculptured as the front; postero-lateral angles of the head with an oblique, elongate, subparallel-sided tubercle directed toward the eyes, the greatest distance between the tubercles slightly less than the least distance between the eyes; genae closely punctured like the vertex; relative widths of head and thorax, 6.5–7.

Thorax ferruginous; dorsum of thorax closely, confluently rugoso-punctate, clothed with sparse, recumbent, golden pubescence; propleura irregularly punctate, the margins with large, deep punctures, the disk with minute, fine punctures; anterior half of mesopleura with close, very fine punctures, the posterior half with large, confluent punctures, these two punctate areas encroaching upon one another; ventral half of metapleura with large, close punctures, interspersed with very fine, minute punctures; the dorsal half of the metapleura glabrous, with indistinct, close, minute punctures; sides of propodeum with large, confluent punctures; ventral half of posterior face of propodeum with large, scattered punctures, interspersed with close, distinct, minute punctures; dorsal half of the posterior face of propodeum and dorsum of propodeum very coarsely and deeply rugoso-punctate; scutellar scale prominent.

Abdomen black; first tergite dark mahogany red, the disk with scattered, large, elongate punctures, interspersed throughout with very fine, close, distinct punctures; apex of first tergite closely, confluently punctate, with an apical fringe of long black hairs; second tergite with a pair of small basal, and a pair of large, subrectangular, subapical, pale yellow spots; punctures of the second tergite separated, large, distinct laterally, sparse on the two basal spots, close, separated, and distinct on the two subapical spots, very coarse, close and confluent elsewhere; spots on second tergite with sparse, golden pubescence, the lateral portions of tergite with silvery pubescence, remainder with sparse, black pubescence, and the apical margin with a fringe of black hairs (except lateral extremes silvery); tergites 3–5 with close, distinct punctures, the third with sparse, black pubescence and an apical fringe of black hairs (except lateral extremes silvery); tergites 3–5 with close, distinct punctures, the third with sparse, black pubescence and an apical fringe of black hairs (except lateral extremes silvery), the fourth and fifth with sparse silvery pubescence and apical fringes of silvery hairs; pygidium strongly longitudinally striate, the striae slightly diverging; first sternite with a median longitudinal carina, but not prominent, the sternite with a few, scattered, indistinct punctures; second sternite dark mahogany red, with large, well-separated, deep punctures sparser on the disk than at the sides, with very sparse, long, erect and recumbent, pale silvery hairs, and a thin apical fringe of pale silvery hairs; sternites 3–5 with large, close punctures, the latter closer and confluent at the apical margin, each sternite clothed with sparse, silvery pubescence and an apical fringe of silvery hairs.

Legs ferruginous, sparsely clothed with pale silvery hairs.

Holotype.—Female, Payne County, Okla., July 5, 1925 (W. J. Brown), in collection of University of Minnesota.

Paratypes.—Female, Payne County, Okla., July 5, 1925 (W. J. Brown); female, Hot Springs, Ark., July 14, 1909 (H. S. Barber); female, Riley County, Kans., August 5 (Popenoe); female, Colorado County, Tex., May 27, 1922 (Grace O. Wiley). Paratypes in collections of United States National Museum, University of Minnesota, Kansas Agricultural College, and the author.

This species is closely related to *quadriguttata* Say but is distinctly different and easily separated from the fact that the pubescence and apical fringes of the first, second, and third tergites are black. In *quadriguttata* the apical fringes of the first, second, and third tergites are pale silvery in color. The paratypes vary in length from 8–12 mm.

57. DASYMUTILLA BIGUTTATA (Cockerell)

?*Mutilla vagans* Fabricius, Ent. Syst. Suppl., p. 282, 1798, female.

Sphaerophthalma quadriguttata var. *biguttata* Cockerell, Ent. News, vol. 6, p. 63, 1895, female.

Mutilla quadriguttata var. *biguttata* Dalle Torre, Cat. Hymen., vol. 8, p. 76, 1897, female.—Fox, Trans. Amer. Ent. Soc., vol. 25, p. 239, 1899, female.

Ephuta (*Ephuta*) *quadriguttata* var. *biguttata* André, Gen. Ins., vol. 1, fasc. 11, p. 63, 1903, female.

Type.—Female, Cat. No. 40731, U.S.N.M., Columbus, Texas (Wickham).

Distribution.—Mississippi, Texas, Kansas, and Arizona.

SPECIMENS EXAMINED

Arizona: Female, Fort Apache, Arizona, August 26, 1897.

Kansas: Female, Riley County, August 2 (G. A. Dean); female, Medora, September 21, 1912 (W. Knaus).

Mississippi: Female, Starkville, summer, 1915 (H. F. Wallace).

Texas: Female, Rock Island, August 5, 1922 (Grace O. Wiley); female, Rock Island, August 18, 1922 (Grace O. Wiley); female, Beaumont, August, 1918 (G. E. Riley).

The description of this species is as follows:

Female.—Head and thorax red, abdomen black, the second tergite with a pair of pale yellow spots on the apical half. Length, 8.5 mm.

Head, red, sparsely clothed with short, recumbent, golden hairs, and a few scattered erect hairs; mandibles unidentate at the apex and with a single tooth within; cephalic face of clypeus transversely concave, glabrous, the posterior half finely and very closely punctured; scape with moderate, separated punctures; first segment of flagellum short, one and one-half times as long as it is broad at the apex; antennal scrobes not carinate above; front coarsely, confluently punctate; vertex and genae closely punctate, not as coarsely punctate as the front; posterior margin of the head with a pair of very prominent elongate tubercles, the distance between the tubercles about equal to the distance between the inner margin of the eyes; relative widths of head and thorax 5.5–5.5.

Thorax red, clothed above with sparse, recumbent, golden hairs; dorsum of thorax coarsely, confluently punctured; cephalic face of pronotum longitudinally striate; junction of cephalic and dorsal face of pronotum angulate; propleura with moderate, separated punctures; anterior half of mesopleura with close, very fine punctures, the posterior half with very large, confluent punctures; ventral half of metapleura with moderate, scattered punctures, dorsal half impunctate, glabrous; sides of propodeum with moderate, shallow, separated punctures; basal half of posterior face of propodeum with moderate, separated punctures, the dorsal half very coarsely, confluently punctate; scutellar scale prominent.

First tergite of abdomen red, with moderate, separated, punctures on the disk and close, small punctures at the apical margin, the latter with a thick fringe of silvery hairs; second tergite black, with a pair of large, pale yellow, rectangular spots on the apical half, with very close, elongate, confluent punctures on the disk, the punctures separated laterally, and distinctly separated on the pale spots; pubescence of second tergite sparse, recumbent, black except laterally with the pubescence silvery and the pubescence of the pale spots corresponding with the color of the integument; apical margin of second tergite with a thick fringe of silvery pubescence; tergites 3–5 black, with close, coarse, confluent punctures, the apical margin of each with a thick fringe of silvery pubescence; pubescence of disk of third tergite black, of the fourth and fifth silvery; pygidium distinctly longitudinally striate, the lateral margins somewhat reflexed; first sternite ferruginous, the median longitudinal carina not well developed, with a few small scattered punctures; second sternite dark mahogany red, with large, elongate, well-separated punctures, except at the base medially the punctures smaller and closer, apical margin with a thin fringe of silvery hairs; sternites 3–5 closely punctate, the apical margin of each with a thin fringe of silvery hairs.

Legs ferruginous, clothed with sparse, pale silvery hairs.

While *biguttata* was originally described and has been considered as a variety of *quadriguttata*, the series of specimens at hand indicate very clearly that it is a distinct species. The specimens vary in length from 8.5 to 13 mm. This species is very distinct from *quadriguttata* in having only two pale spots on the second tergite of the abdomen, the tubercles of the posterior margin of the head much more prominent, and the junction of the cephalic and dorsal surface of the pronotum angulate rather than rounded. It differs from *curticeps* in having the tubercles much closer to the median line of the head, thus giving it a less truncate appearance posteriorly, and by the absence of the thick brush of hairs on the propodeum. The specimen from Fort Apache, Ariz., is not typical in color; it has the abdomen distinctly ferruginous.

58. DASYMUTILLA CURTICEPS, new species

Female.—Head and thorax red, abdomen blackish with two yellowish red spots above. Legs mahogany red. Length, 12 mm.

Head red, the front and vertex clothed with sparse, golden, recumbent hairs and a few scattered, erect, dark hairs, remainder of head sparsely clothed with silvery hairs; mandibles unidentate at the apex, with a single tooth within; cephalic face of clypeus transversely concave, glabrous, the dorsal face closely punctured; clypeal fringe of long, pale reddish hairs; scape moderately and closely punctate above, clothed with short, golden hairs; first segment of flagellum shorter than the second and third segment united, one and two-thirds times as long as it is wide at the apex; antennal scrobes not carinate above; front deeply, confluently, and rugosely punctate; vertex with moderate, separated punctures, the posterior margin squarely truncate; a very prominent glabrous tubercle at each postero-lateral angle of the head; genae with moderate, separated punctures; relative widths of head and thorax, 8–8.5.

Thorax red; dorsum of thorax coarsely, more or less confluently foveate, the fovea smaller and less coarse anteriorly; dorsum clothed with sparse, silvery hairs, anterior half of mesopleura finely and junction of anterior face of pronotum and dorsum of pronotum angulate, the anterior face longitudinally striate; scutellar scale prominent; propleura with large, deep, confluent punctures, clothed with sparse, silvery hairs, anterior half of mesopleura finely and closely punctate, clothed with fine silvery hairs; posterior half of mesopleura with large, shallow, confluent punctures, clothed with sparse, silvery hairs; ventral half of metapleura with large, shallow, more or less confluent punctures, the dorsal half glabrous, with small, indistinct punctures, clothed with sparse silvery pubescence; sides of propodeum with large, shallow, separated punctures, clothed with sparse, silvery hairs; posterior face of propodeum with large, deep, confluent punctures, the dorsal face deeply foveate; a brush of very thick, coarse, golden hairs at the junction of the posterior and dorsal faces of the propodeum.

Abdomen blackish, really a very dark mahogany red; first tergite lighter mahogany red than the following, with more or less confluent, large punctures, sparsely clothed with long, erect, pale hairs, and with a thick apical fringe of silvery pubescence; second tergite black, with two large, lateral, yellowish-red spots on the posterior part of the tergite (in the type the dextro-lateral spot is very obscure); lateral basal areas of second tergite with shallow, elongate punctures, the disk with deep, small, very close punctures basally, the punctures becoming shallow and separated toward the apex;

the punctures of the pale spots large, shallow, and distinctly separated; hairs of the second tergite black on the disk, pale laterally, golden on the pale spots, and a thick fringe of silvery hairs at the apical margin; tergites 3–5 with close, more or less confluent punctures, clothed with sparse, silvery hairs; pygidium coarsely, longitudinally striate, the lateral margins distinctly reflexed; carina of first sternite not sharp and prominent; first sternite with large, close, shallow punctures, clothed with long, sparse, pale, erect hairs; second sternite with large, elongate, usually separated punctures, clothed with sparse, erect, pale hairs, and a thin fringe of silvery hairs at the apical margin; sternites 3–5 with moderate, very close, confluent punctures, clothed with sparse, erect, pale hairs, and each with a thin fringe of silvery hairs at the apical margin.

Legs mahogany red, clothed with long, pale, erect hairs.

Holotype.—Female, Comanche County, Kans., 1916 (R. H. Beamer), in collection of University of Kansas.

Paratypes.—Female, Mineola, Tex., July 19, 1906 (Bishopp and Jones); female, Rock Island, Tex., June 18, 1922 (Grace O. Wiley). Paratypes in collection of United States National Museum and University of Minnesota.

The paratypes are smaller than the type; length, 9.5 mm.

This species is most closely related to *biguttata* Cockerell. It is at once distinguished from *quadriguttata* by the presence of only two pale spots on the second tergite of the abdomen. It differs from *biguttata* in having the posterior margin of the head truncate, the postero-lateral tubercles very large and prominent, the brush of thick hairs at the junction of the dorsal and posterior faces of propodeum, and by the distinctly reflexed lateral margins of the pygidium. *Biguttata* has an indication of a brush of hairs on the propodeum but the hairs are very sparse, making it much less prominent. The thorax of *curticeps* is noticeably longer and more narrow than in *quadriguttata.*

59. DASYMUTILLA NITIDULA, new species

Female.—Head black, the vertex sparsely clothed with golden pubescence; thorax ferruginous; abdomen black, the second tergite maculated with a pair of subapical pale yellow spots. Length, 13 mm.

Head black, the vertex obscurely ferruginous; the front and vertex clothed with sparse, appressed, golden pubescence, and a few scattered erect hairs; mandibles acute at the apex, unidentate on the inner margin; cephalic half of clypeus transversely concave, glabrous, impunctate; caudal half of clypeus closely punctured; clypeal fringe thin, of long, dark hairs; antennal scrobes not carinate above; scape coarsely and closely punctate, clothed with sparse, coarse hairs; first segment of flagellum scarcely as long as segments two and three united, twice as long as it is broad at the apex; front very coarsely, deeply, and confluently punctate; vertex with coarse, close, more or less confluent punctures but not as coarsely sculptured as the front; posterior portion of the head with a pair of very elongate, subparallel-sided, glabrous tubercles directed outward toward the eyes, the greatest distance between the tubercles greater than the least distance between the eyes; genae closely, confluently punctured, but not as coarsely sculptured as the front; relative widths of head and thorax, 8–9.

Thorax ferruginous; junction of the cephalic face and dorsum of pronotum angulate; pronotum and mesonotum very coarsely, confluently punctate, sparcely clothed with appressed, golden pubescence and a few scattered erect hairs; propleura with large, close punctures; anterior half of mesopleura very finely punctate, the posterior half with large, coarse, confluent punctures; extreme ventral part of metapleura coarsely, confluently punctate, a few scattered punctures on the ventral half adjoining this area, and the dorsal half glabrous, impunctate; sides of propodeum with large, coarse punctures; ventral half of the posterior face of the propodeum with small, close punctures; the dorsal half of the posterior face of the propodeum and the dorsum of the propodeum very coarsely, confluently punctate, with a thin brush of long, golden hairs; scutellar scale prominent.

Abdomen black; first tergite with large, close punctures, clothed with sparse, long, erect, grayish hairs, and a thin apical fringe of black hairs; second tergite coarsely and closely punctate throughout, the punctures confluent on the disk, clothed with sparse, appressed, black pubescence and scattered, erect, dark hairs, except the pubescence of the pale spots golden; apical fringe of second tergite black, except lateral extremes silvery; the lateral margins of the second tergite with a margin of silvery pubescence; tergites 3–5 closely, confluently punctate, the third tergite clothed with appressed, black pubescence, scattered, erect, dark hairs, and a black apical fringe (except lateral extremes of fringe silvery); tergites 4 and 5 clothed with silvery pubescence; pygidium distinctly, longitudinally striated; first sternite with a median, longitudinal carina, punctures scattered, and with sparse, erect, silvery hairs; second sternite with large, close, more or less confluent punctures, the latter sparser on the disk, closer laterally; sternites 3–5 closely, confluently punctate; apical fringes of sternites 2–4 silvery, that of sternite 5 dark, almost black.

Legs very dark mahogany red or black, clothed with long, sparse, silvery hairs.

Holotype.—Female, Payne County, Okla., June 3, 1925 (W. J. Brown), in collection of University of Minnesota.

Paratypes.—Female, Payne County, Okla., June 3, 1925 (W. J. Brown); female, Payne County, Okla., June 13, 1925 (W. J. Brown); 5 females, Payne County, Okla., June 24, 1924 (W. J. Brown); female, Rooks County, Kans., August 27; 2 females, Clark County, Kans., June (Snow); female, Seward County, Kans., August 18, 1911 (F. X. Williams); female, Grant County, Kans., July 23, 1911 (F. X. Williams); female, western Kansas (Popenoe); female, Colorado County, Tex., July 18, 1922 (Grace O. Wiley). Paratypes in collections of University of Minnesota, United States National Museum, University of Kansas, Kansas Agricultural College, Cornell University, W. J. Brown, and the author.

This species is beautifully marked and easily identified. It differs from *biguttata* in having the head black, a thin brush of hairs on the propodeum and the apical fringes of the first, second, and third tergites black. The specimen from Texas has the pubescence and fringes of all the tergites black.

60. DASYMUTILLA ELECTRA (Blake)

Mutilla electra BLAKE, Trans. Amer. Ent. Soc., vol. 4, p. 75, 1872, female; Trans. Amer. Ent. Soc., vol. 7, p. 245, 1879, female.—DALLE TORRE, Cat. Hymen., vol. 8, p. 33, 1897, female.

Sphaerophthalma electra BLAKE, Trans. Amer. Ent. Soc., vol. 13, p. 248, 1886, female.

Mutilla quadriguttata FOX, Trans. Amer. Ent. Soc., vol. 25, p. 239, 1899, female (part).—MELANDER, Trans. Amer. Ent. Soc., vol. 29, p. 297, 1903, female (part).

Type.—Female, Dallas County, Tex. Blake described this species from two female specimens in the Boll collection loaned him by the Museum of Comparative Zoölogy, Cambridge, Mass. He returned one specimen to the Museum of Comparative Zoölogy and evidently kept one at Philadelphia. One of the two must be considered the type. In the case of uniques of other species the specimens were returned to Cambridge, so it would seem that the specimen in the collection of the Museum of Comparative Zoölogy should be regarded as the type. The specimen at Cambridge and the one at Philadelphia are conspecific, so our conception of the species would not be altered in any case.

Distribution.—Texas.

SPECIMENS EXAMINED

TEXAS: Female, Olivia, August 26, 1909 (J. D. Mitchell); 2 females, Cuero, June 19 (Townsend); female, Colorado County, June 5, 1922 (Grace O. Wiley); female, Rock Island, June 9, 1922 (Grace O. Wiley); female, Colorado County, June 23, 1922 (Grace O. Wiley); female, Colorado County, July 18, 1922 (Grace O. Wiley); female, Rock Island, August 5, 1922 (Grace O. Wiley); female, Colorado County, September 8, 1922 (Grace O. Wiley);

female, Lee County, August 7; female, Lee County, September 12, 1905; female, Lee County, September 13, 1905; female, Fedor, September 16, 1905; 2 females, Fedor.

Electra differs not only in color and markings from *quadriguttata* but is also much more coarsely sculptured throughout than the latter species. It should be considered as a distinct species.

61. DASYMUTILLA WILEYAE, new species

Female.—Head and thorax black, abdomen red dorsally. Length, 11 mm. Head black with a slight reddish tinge, sparsely clothed with erect and recumbent black hairs; mandibles acute at the apex, a small tooth within; clypeus concealed by long, black hairs; scape sparsely clothed with coarse hairs; first segment of flagellum equal in length to segments two and three united; antennal scrobes not carinate above; front and vertex rugoso-reticulate; genae very closely and moderately punctate; postero-lateral angles of head with a rectangular shiny tubercle (similar in character and position to those found in *interrupta* and *quadriguttata*); relative widths of head and thorax 5–5.5.

Thorax black, much longer than broad, sparsely clothed with erect and recumbent black hairs; dorsum of the thorax rugoso-reticulate; propleura coarsely and very closely punctate; mesopleura sparsely, microscopically punctate on the anterior third, coarsely and closely punctate on the posterior two-thirds; metapleura shining with a few, large, scattered punctures ventrally; sides of propodeum shining, with large, scattered punctures on the anterior one-half, very closely and coarsely punctured on the posterior half; posterior face of propodeum at right angles to the dorsum, coarsely rugoso-reticulate.

Abdomen black; first tergite coarsely punctated, especially toward the apex, sparsely clothed with long, black hairs; integument of second tergite black on the basal two-fifths, red on the median two-fifths, and black on the apical fifth; second tergite with very deep, coarse, and confluent punctures, the latter more separated at the lateral margins; basal and lateral margins of second tergite with scattered black hairs; remainder of tergite with thin, brilliant red pubescence; tergites 3–5 closely punctured and with thin, brilliant red pubescence; pygidium longitudinally striated; second sternite with large, rather close punctures and scattered, long, pale hairs, depressed and confluently punctate at the apical margin; sternites 3–5 confluently punctate; sternites two and three with a thin apical fringe of brilliant red hairs, the fringes on sternites 4 and 5 obscure and dark, but with a tinge of red.

Legs black; the femora sparsely clothed with black hairs above, pale hairs below; tibiae with black hairs.

Holotype.—Female, Eastland County, Tex., May 27, 1921 (Grace O. Wiley), in entomological collection of the University of Minnesota.

Paratypes.—Female, Eastland County, Tex., May 25, 1921 (Grace O. Wiley); female, Eastland County, Tex., May 27, 1921 (Grace O. Wiley); female, Eastland County, Tex., June 1, 1921 (Grace O. Wiley); female, Eastland County, Tex., June 4, 1921 (Grace O. Wiley); female, Kingsville, Tex., July 25, 1921 (F. M. Hull). Paratypes in collection of United States National Museum, University of Minnesota, Mississippi Agricultural and Mechanical College, and the author.

This species may be easily distinguished from others of the same general appearance, that is, black head and thorax, and red abdomen, by the shiny tubercles on the postero-lateral angles of the head.

62. DASYMUTILLA ANGULICEPS (Fox)

Mutilla anguliceps Fox, Trans, Amer. Ent. Soc., vol. 25, p. 241, 1899, female.

Ephuta (*Ephuta*) *anguliceps* André, Gen Ins., vol. 1, fasc. 11, p. 57, 1903, female.

Dasymutilla (*Dasymutilla*) *anguliceps* Bradley, Trans. Amer. Ent. Soc., vol. 42, p. 323, 1916, female.

Type.—Female, Algonquin, Ill. (Nason), July 19, in collection of Entomological Society of Philadelphia.

Distribution.—Illinois, Iowa, South Dakota, Nebraska, and Kansas.

SPECIMENS EXAMINED

Iowa: Female, Sioux City, May 5, 1920 (C. N. Ainslie).

Kansas: Female, Riley County, July 5 (Popenoe); female, Riley County, July 11 (Popenoe); female, Riley County, July 12 (Popenoe); 4 females (T. B. A.).

Nebraska: Female, Lincoln.

South Dakota: Female, Martin, September 12, 1925 (H. C. Severin).

The sharp truncation of the head, acute postero-lateral angles, the first tergite minutely dentate medially at the sides, and the black apical fringe of the second tergite serve to differentiate this species.

63. DASYMUTILLA CAMPANULA, new species

Female.—Dark ferruginous, the abdomen almost black, except the second tergite with a very large campanulate spot, occupying the entire disk, pale yellow; head subquadrate, truncate behind; propodeum with a thin brush of long, golden hairs on the posterior face above; apical fringes of first, second and third tergites black. Length, 12 mm.

Head dark ferruginous; the front clothed with sparse, appressed, black pubescence, the vertex with sparse, appressed, golden pubescence, and scattered, erect, black hairs; remainder of head with very dark, sparse, semi-erect pubescence; mandibles acute at the apex, unidentate on the inner margin; clypeus transversely concave on the cephalic half, glabrous, impunctate; the caudal half of the clypeus finely, confluently punctate medially; scape coarsely, confluently punctate; first segment of flagellum shorter than the second and third segments united, one and one-third times as long as it is broad at the apex; antennal scrobes not carinate above; front and vertex closely, confluently punctate, the genae with the punctures more spearated; head subquadrate, the sides behind the eyes not converging to meet the postero-lateral angles; posterior portion of the head truncate, the margin slightly sinuate; postero-lateral angles very prominent, bearing a large, subreniform, glabrous tubercle; relative widths of head and thorax, 7.5–8.

Thorax dark ferruginous; junction of the cephalic face and dorsum of pronotum angulate; pronotum and mesonotum coarsely, deeply and confluently foveolate, clothed with sparse appressed, golden pubescence, and scattered, dark, erect hairs; propleura with large, confluent punctures anteriorly, indistinctly punctured posteriorly; anterior half of mesopleura closely, minutely punctate, the posterior half coarsely, confluently foveolate; metapleura glabrous, impunctate except for a few, scattered, large punctures ventrally; sides of propodeum with large, distinct, separated punctures; posterior face of propodeum closely punctate ventrally, coarsely, confluently foveolate on the dorsal half; dorsal half of propodeum with a thin brush of long, erect, golden pubescence; scutellar scale prominent.

Abdomen very dark mahogany red, almost black; first tergite mahogany red, with large, more or less confluent punctures throughout, clothed with sparse, long, erect, silvery pubescence, and a thin apical fringe of black hairs, second tergite dark mahogany red, almost black, with a very large campanulate, yellow spot occupying the entire disk; the second tergite with very large, deep, more or less confluent punctures throughout, the punctures sparser at the sides; pubescence of the maculation of the second tergite sparse, appressed and golden, of the base black, the sides silvery, and the subapical margin and apical fringe (except laterally) black; tergites 3–5 closely, deeply punctate; tergite 3 with the pubescence and apical fringe black (except laterally), tergites 3–5 closely, deeply punctate; tergite 3 with the pubescence and apical fringe black (except laterallly), tergites 4–5 with silvery pubescence; pygidium distinctly reflexed at the sides, longitudinally striate, the striae not reaching the tip, the subapical portion minutely reticulate; first sternite with a prominent longitudinal carina, with large, close punctures, and clothed with sparse, long, erect, silvery pubescence; second sternite with deep, large, elongate, distinct punctures throughout, sparsely clothed with long, erect, silvery pubescence; sternites 3–5 closely, confluently punctate; sternites 2–4 with thin apical fringes of silvery pubescence; sternite 5 with the apical fringe black.

Legs dark ferruginous, sparsely clothed with long, silvery to dark hairs.

Holotype.—Female, Greeley County, Kans. (F. X. Williams), in collection of University of Kansas.

Paratype.—Female, Colorado (Popenoe), in collection of Kansas Agricultural College.

Very distinct and easily recognized by the shape of the head, the thin brush of golden pubescence on the propodeum, and the large, campanulate, yellow spot of the second tergite. The paratype is slightly lighter in color with a length of only 8 mm.

64. DASYMUTILLA CORCYRA, new species

Female.—Ferruginous, dorsum of thorax and base of second tergite with sparse, appressed, black pubescence; second tergite with an apical fringe of black pubescence; propodeum with a thick brush of long, silvery pubescence on the posterior face above; remainder of body with sparse, silvery pubescence; head subquadrate, squarely truncate behind. Length, 8 mm.

Head ferruginous, clothed with sparse, appressed, silvery pubescence, and scattered, darker, erect hairs; mandibles acute at the apex, unidentate on the inner margin; cephalic half of clypeus transversely concave, the surface glabrous, impunctate; caudal half with the medium surface confluently, finely punctate; clypeal fringe, long and thin; scape obscurely punctate; first segment of the flagellum shorter than segments two and three united, twice as long as it is broad at the apex; antennal scrobes not carinate above; front and vertex shallowly, confluently punctate; genae with the punctures more distinct and separated, less sculptured than the front and vertex; posterior portion of head squarely truncate, the lateral margins of the head scarcely converging to meet the postero-lateral, angles; postero-lateral angles very prominent, bearing a triangular, glabrous tubercle; relative widths of head and thorax, 5.75–6.

Thorax ferruginous; junction of cephalic face and dorsum of pronotum angulate; pronotum and mesonotum coarsely, confluently foveolate, clothed with sparse, appressed, black pubescence and scattered, erect hairs, the sides of the mesonotum with traces of sparse, appressed, silvery pubescence; propleura with large confluent punctures near the cephalic margin, scattered, smaller punctures caudally; anterior half of mesonotum glabrous, indistinctly punctate, the posterior half coarsely, confluently punctate; metapleura glabrous, with a few, scattered punctures on the ventral half; sides of propodeum glabrous, with a few scattered, distinct punctures; posterior face of propodeum coarsely sculptured, but hidden by the dense, thick brush of long, silvery pubescence on the dorsal half; scutellar scale very prominent.

Abdomen ferruginous; first tergite glabrous, with shallow, scattered, elongate punctures, clothed with sparse, long, erect, silvery pubescence and an apical fringe of silvery hairs; second tergite with shallow, elongate punctures, sparse at the sides, more or less confluent on the disk; basal third and subapical margin of second tergite (except laterally) with sparse, appressed, black pubescence, the apical margin (except laterally) with a fringe of black hairs, the sides with sparse, silvery pubescence, remainder of disk with sparse, appressed, golden pubescence; tergites 3–5 with scattered, indistinct punctures, clothed with sparse, silvery pubescence; pygidium strongly convex, especially at the base, distinctly longitudinally striate, the striae not reaching to the tip, the subapical portion of the pygidium very minutely reticulate; first sternite with a median longitudinal carina, clothed with sparse, long, erect, silvery hairs; second sternite with large, close, more or less confluent, deep punctures, sparsely clothed with long, erect, silvery pubescence; sternites 3–5 with shallow, scattered punctures; sternites 2–5 with a thin apical fringe of silvery hairs.

Legs ferruginous; sparsely clothed with long, silvery pubescence.

Holotype.—Female, Rock Island, Tex., Skull creek, July 25, 1922 (Grace O. Wiley), in collection of University of Minnesota.

Paratype.—Female, Lee County, Tex., June 8, 1906, in collection of Museum of Comparative Zoölogy.

Very similar to *birkmani* in general habitus, but very distinct by the shape of the head and the dense pubescence of the propodeum.

65. DASYMUTILLA CALIFORNICA (Radoszkowski)

Mutilla californica Radoszkowski, Horae Soc. Ent. Ross., vol. 1, p. 86, pl. 2, fig. 7, 1861, female.

Ephuta (Ephuta) californica André, Gen. Ins., vol. 1, fasc. 11, p. 60, 1903, female.

Type.—Female, California.

The Latin description published by Radoszkowski and a translation of the description in Russian which accompanied it are as follows:

Caput nigrum, nigro-villosum, fronte macula rufo-pillosa, magna ornata. Antennae nigrae. Thorax niger, nigro-villosus, supra rufus. Abdomen nigrum, nigro-villosum, segmentis omnibus supra rufo-villosis, excepto primo antice atro. Pedes nigri, nigro-spinosi. Femina.

Head black, front covered with a large spot dark-yellow in color and with shaggy long hairs of the same color.

Antennae black. Thorax black, all of the dorsum clothed with dark yellow long hairs.

Abdomen black, all of the upper surface from the base of the second segment clothed with dark yellow hairs.

Margin of the yellow hair at the base of the second abdominal segment forms a heart-shaped outline.

> Legs black; bases of the legs provided with coarse hairs. Female.
> This species received from California by Mr. Wosnessenski.

Radoszkowski also gave a colored figure of this species. The figure shows the thorax to be distinctly longer than broad, and the pubescence of the head, thorax above, and abdomen above, yellow.

Cresson (1865) published a description in English as that of *californica*, and this rather than the original description has stood as the basis for the identification of this species since that time. Obviously Cresson's description is not a translation of the one published by Radoszkowski since it neither agrees with the latter nor with the published figure. Apparently Cresson's description is that of a female *fulvohirta* which he misidentified as *californica*. This appears to be true, because he writes that " the thorax is short, broad ovate when viewed from above," which agrees with *fulvohirta* very well, but which does not agree with the published figure of *californica*, which shows the thorax to be distinctly longer than broad. None of the species known from California conform to Cresson's description; on the other hand, he states that his specimens are from Colorado territory, and the only species that agrees with his description from that region is *fulvohirta*, which is not known from California.

The type of this species appears from the original article to be in the collection of the St. Petersburg Academy of Science and I have been unable to examine it. It is believed, however, that the specimens here designated as *californica* are the true *californica* for the following reasons: The specimens are all from California; the thorax is longer than broad, and the pubescence above yellow, as indicated in Radoszkowski's figure; several of the specimens also have the yellow pubescent area of the abdomen above cordate at the base, a character mentioned in the original Russian description and indicated very plainly in the figure.

The following is a description of the species as it is understood here:

Female.—Black; front, vertex, thorax above, and abdomen above from base of second tergite clothed with long, erect, yellow pubescence. Length, 9.5 mm.

Head very dark mahogany red, almost black; mandibles acute at the apex, unidentate within at a point about one-third their length from the apex; clypeal fringe of long, dark hairs; scape closely punctured, sparsely clothed with short, coarse pubescence; first segment of the flagellum not twice as long as its own width at the apex; a distinct curved carina extending from the antennal tubercles to the margins of the eyes; front and vertex with very large, confluent punctures, clothed with erect and recumbent, long yellow pubescence, with erect, scattered dark hairs intermixed; the posterior margin of the head with a pair of lateral, glabrous tubercles; genae glabrous, with large punctures usually separated, not nearly as coarsely sculptured as the front and vertex; relative widths of head and thorax, 6.8–8.

Thorax very dark mahogany red, almost black; dorsum coarsely foveate, clothed with long, erect and recumbent, yellow pubescence; propleura with rather close, moderate punctures, clothed with sparse, black pubescence; anterior half of mesopleura glabrous, with small, shallow, more or less indistinct punctures, clothed with sparse, black pubescence; posterior half of mesopleura foveate, clothed with very long, erect black pubescence; metapleura glabrous, impunctate dorsally, indistinctly punctured ventrally, except a few large, deep punctures at the extreme base, clothed with sparse, black pubescence; sides of propodeum with mostly indistinct punctures, the posterior margin with foveate, close punctures, sparsely clothed with black pubescence; posterior face of propodeum foveately punctured, the dorsal half clothed with very long, erect, very dense, black pubescence; scutellar scale very prominent.

Abdomen very dark mahogany red, almost black; first segment short, subsessile with the second; first tergite punctured throughout, clothed with long, erect, black pubescence; second tergite punctured throughout, the punctures at the base and sides stronger and more distinct than those of the disk; tergites 3–5 indistinctly punctate; tergites 2–5 clothed with long, dense, erect and recumbent yellow pubescence; the anterior margin of the area of yellow pubescence on the second tergite cordate in outline; pygidium irregularly rugose; first sternite with a median longitudinal keel on the anterior half; second sternite with moderate, usually well-separated punctures; sternites 3–5 indistinctly punctate; sternites 2–5 clothed with sparse, erect, black pubescence, and each with an apical fringe of thick pubescence, the median portion of the fringe black, lateral portions yellow.

Legs black, clothed with long, black pubescence.

Plesiotype.—Female, Dyerville, Calif., in collection of University of Minnesota.

Distribution.—California and Utah.

SPECIMENS EXAMINED

CALIFORNIA: Female, La Jolla, San Diego County, August 18, 1919 (H. Klotz); female, La Jolla, San Diego County, August 26, 1919 (H. Klotz); female, La Jolla, San Diego County, August 27, 1919 (H. Klotz); female, San Diego, July 2, 1918 (J. D. Timkins); female, Laguna; 2 females, Los Angeles County, September; 7 females, Los Angeles County; female, San

Bernardino County; female, Claremont (Essig); female, Mountains near Claremont (Baker); female, Delano, June 21 (H. M. Jeancon); female, Coalinga, June 1-3, 1907 (Bradley); female, Pacific Grove (Saunders); female, Carmel, June 4; female, Carmel, July 7, 1915; female, Stanford University, June, 1916 (I. McCracken); female, Berkeley (E. P. Van Duzee); 2 females, Point Reyes, September 10, 1906; female, Marin County, September 8, 1904; female.

UTAH: Female, Trout Creek, Ibapah Mountains, September 4, 1922 (Tom Spalding); female, North Fork, Provo Canyon, September 13 (Tom Spalding); female, Logan; female, Avon, August 19, 1920 (G. E. King).

The specimens at hand vary in size from 5.5 mm. to 12 mm.; one specimen has the pygidium longitudinally rugose instead of irregularly rugose; several specimens have the anterior margin of the yellow pubescence of the abdomen above cordate in outline, while the majority of them have the yellow pubescence extending to the anterior margin of the second tergite. The lateral tubercles on the posterior margin of the head, and the long, erect, very dense, black pubescence on the dorsal half of the posterior face of the propodeum will at once distinguish this species from any of those that resemble it superficially.

66. DASYMUTILLA CALIFORNICA var. CLIO (Blake)

Mutilla clio BLAKE, Trans. Amer. Ent. Soc., vol. 7, p. 251, 1879, female.—DALLE TORRE, Cat. Hymen., vol. 8, p. 25, 1897, female.—FOX, Trans. Amer. Ent. Soc., vol. 25, p. 238, 1899, female.

Sphaerophthalma clio BLAKE, Trans. Amer. Ent. Soc., vol. 13 p. 214, 1886, female.

Ephuta (Ephuta) clio ANDRÉ, Gen. Ins., vol. 1, fasc. 11, p. 58, 1903, female.

Type.—Female, Vancouver's Island (H. Edwards), in collection of Entomological Society of Philadelphia.

Distribution.—Idaho, British Columbia.

SPECIMENS EXAMINED

IDAHO: Female, Boise, June 29, 1902 (H. E. Burke).

The type has been examined and the specimen from Idaho found to be identical with it. This latter specimen is also identical with specimens of *californica* from California in every respect except the black spot on the apical margin of tergite 2, median portion of tergite 3, and extending onto the median portion of tergite 4. This spot is formed by long, black hairs intermixed with a few long, yellow hairs. A specimen of *californica* from Dyerville, Calif., exhibits a tendency towards the formation of a similar spot, there being enough black hairs on the median apical margin of tergite 2 to give a faint indication of such a marking. Since *clio* is identical in every way with *californica*, with the exception of the black marking of the abdomen, I regard it as only a variety of *californica.*

67. DASYMUTILLA CARINICEPS (Fox)

Mutilla cariniceps Fox, Trans. Amer. Ent. Soc., vol. 25, p. 241, 1899, female.

Ephuta (*Ephuta*) *cariniceps* André, Gen. Ins., vol. 1, fasc. 11, p. 58, 1903, female.

Dasymutilla scrobinata, Rohwer, Proc. U. S. Nat. Mus., vol. 41, p. 462, 1912, female; Bull. 22, Conn. Geol. & Nat. Hist. Surv., p. 625, 1916, female.—Rau, Trans. Acad. Sci. St. Louis, vol. 24, p. 6, 1922, female.

Dasymutilla (*Dasymutilla*) *cariniceps* Bradley, Trans. Amer. Ent. Soc., vol. 42, p. 323, 1916, female.

Dasymutilla cariniceps Banks, Ann. Ent. Soc. Amer., vol. 14, p. 25, 1921, female.—Mickel, 19th Rep. State Ent. Minnesota, p. 106, 1923, female.

Type.—Female, New Jersey, in collection of American Entomological Society of Philadelphia.

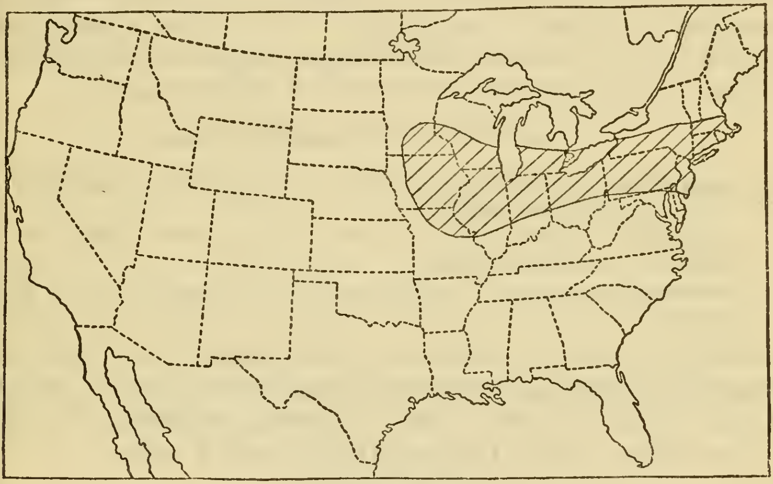

Fig. 18.—Distribution of Dasymutilla cariniceps (Fox)

Distribution.—Massachusetts, Connecticut, New York, New Jersey, Pennsylvania, Michigan, Illinois, Missouri and Minnesota. (Fig. 18.)

SPECIMENS EXAMINED

Connecticut: Female, Hartford, September 15, 1895.

Illinois: Fèmale, McHenry, August, 1903.

Massachusetts: Female, Nantucket Island; female, Mount Toby, Franklin County, September 28, 1919 (Priscilla Butler); female, Great Barrington, July 24, 1910.

Michigan: Female, Agricultural College, July 27, 1887 (Gillette); female, (Gillette); female, Berrien County, Warren Woods, September 7, 1920 (T. H. Hubbell); female.

MINNESOTA: Female, Castle Rock, August 20, 1922 (F. C. Fletcher); female, Olmstead County, July (C. N. Ainslie); female, Anoka County, Fridley sand dunes, July 21, 1922 (C. E. Mickel).

NEW JERSEY: Female, Da Costa, August 3, 1902; female, Bergen County, July 14, 1918 (E. D. Quirsfeld); female, Delaware Water Gap.

NEW YORK: 3 females, Fishers Island, Long Island, August, 1878 (J. L. Zabriskie); female, Fishers Island, Long Island, 1879; female, Kisscus Lake, Long Island, August 20, 1911; female, Cold Springs Harbor, L. I., July 16, 1921 (S. H. Emerson); female, Cold Springs Harbor, L. I., September 13, 1922 (E. G. Anderson); female, Ithaca, July 9, 1891; female, Ithaca, July, 1884 (J. M. Stedman); female, Ithaca, August 5, 1885 (F. V. Coville); female, Ithaca, August 6, 1885 (T. L. Brunk); female, Ithaca, August 7, 1889; female, Ithaca, August 13, 1896; female, Ithaca, 1874 (Comstock).

PENNSYLVANIA: Female, North Cumberland, July 27; female, Cochranton, August 4, 1922 (F. M. Trimble); female, Pittsburg, July 12, 1922 (F. M. Trimble); female.

The types of both *cariniceps* Fox and *scrobinata* Rohwer have been examined and found to be identical. The species is easily distinguished by the tuberculate postero-lateral angles of the head and the antennal scrobes being defined above by a delicate carina.

68. DASYMUTILLA CHATTAHOOCHEI Bradley

Dasymutilla (*Dasymutilla*) *chattahoochei* BRADLEY, Trans. Amer. Ent. Soc., vol. 42, p. 324, 1916, female.

Dasymutilla (*Dasymutilla*) *arenerronea* BRADLEY, Trans. Amer. Ent. Soc., vol. 42, p. 324, 1916, female.

Dasymutilla chattahoochei BANKS, Ann. Ent. Soc. Amer., vol. 14, p. 25, 1921, female.

Holotype.—Female, Bainbridge, Georgia, July 15–27, 1909 (J. C. Bradley), in collection of Cornell University (No. 114.1). The type of *arenerronea* is in the Cornell University collection (No. 115.1).

Distribution.—North Carolina, Georgia, and Florida.

SPECIMENS EXAMINED

FLORIDA: Female, St. Petersburg, August 12, 1910 (J. C. Bradley); female, Fort Myers, May 7, 1916 (J. C. Bradley); female, Orange City Junction, May 4, 1916; female, Gainesville, September 26–October 2; 2 females, Sannibel Island, May 12, 1916 (J. C. Bradley); female, De Funiak Springs, Oct. 17–19, 1914.

GEORGIA: 17 females, Spring Creek, Decatur County, May 18–21, 1916 (J. C. Bradley); female, Spring Creek, Decatur County, June 7–23, 1911 (J. C. Bradley); 3 females, Spring Creek, Decatur County, July 16–29, 1912 (J. C. Bradley); female, Spring Creek, Decatur County, August 26–28, 1913 (J. C. Bradley); female, Bainbridge, June 2, 1916 (J. C. Bradley); female, Bainbridge, September 3–7, 1910 (J. C. Bradley); female, Billy's Island, Okefenokee swamp, June, 1912; female, Billy's Island, Okefenokee swamp, September 1–5, 1913; female, Stone Mountain, August 3, 1913.

NORTH CAROLINA: Female, Southern Pines, June 14, 1911 (A. H. Manee).

The types of *chattahoochei* and *arenerronea* have been examined and found to be identical. The appearance of the posterior portion of the head varies according to its position and the angle of view. I can find no fundamental difference between the two types. The most characteristic feature of the species is the sculpture of the posterior and dorsal surfaces of the propodeum which are asperated; the general surface of the propodeum is smooth with strong, pointed, tooth-like elevations scattered over it giving the propodeum a rasp-like appearance. The specimens vary in length from 5.5 to 8 mm.

69. DASYMUTILLA RUGULOSA (Fox)

Mutilla rugulosa Fox, Trans. Amer. Ent. Soc., vol. 25, p. 240, 1899, female.

Ephuta (*Ephuta*) *rugulosa* André, Gen. Ins., vol. 1, fasc. 11, p. 63, 1903, female.

Mutilla infensa Melander and Brues, Biol. Bull., vol. 5, p. 24, 1903, female.—Melander, Trans. Amer. Ent. Soc., vol. 29, p. 299, 1903, female.

Mutilla canella Melander, Trans. Amer. Ent. Soc., vol. 29, p. 298, 1903, female.

Dasymutilla (*Dasymutilla*) *rugulosa* Bradley, Trans. Amer. Ent. Soc., vol. 42, p. 325, 1916, female.

Dasymutilla vesta Washburn, 17th Rept. State Entomologist of Minn., p. 209, fig. 95, 1918 (not of Cresson).

Dasymutilla rugulosa Banks, Ann. Ent. Soc. Amer., vol. 14, p. 25, 1921, female.—Mickel, 19th Rept. State Entomologist of Minn., p. 106, 1923, female.

Type.—Female, Southern New Jersey, September, in collection of Entomological Society of Philadelphia. The type of *infensa* is in the collection of Washington State College, Pullman, Washington.

Distribution.—Massachusetts, Connecticut, New York, New Jersey, Michigan, Indiana, Minnesota, South Dakota, North Dakota, and Manitoba, Canada. (Fig. 19.)

SPECIMENS EXAMINED

Connecticut: Female, Lyme, August 15, 1915.

Indiana: Female, Hebron, July 17, 1925 (J. A. Harris, Jr.); female, Gary, July 18, 1925 (J. A. Harris, Jr.).

Manitoba, Canada: Female, Aweme, July 23, 1915 (N. Criddle).

Michigan: 35 females, Ann Arbor, July 16, 1923 (E. G. Anderson); 4 females, Ann Arbor, August 24, 1923 (E. G. Anderson); female, Dexter, July 18, 1923 (E. G. Anderson); 7 females, Dexter, July 27, 1924 (E. G. Anderson); female, Dexter, September 14, 1924 (E. G. Anderson); female, Dexter, September 16, 1924 (E. G. Anderson); 2 females, Dexter, September 19, 1924 (E. G. Anderson); 2 females, Dexter (E. G. Anderson); 2 females, Jackson, July 22, 1925 (G. E. Matson); 4 females, Jackson, July 24, 1925 (G. E. Matson); female, Jackson. July 25, 1925 (W. M. McComb); 2 females, Jackson, July 29, 1925 (W. M. McComb); female, Jackson, July 29, 1925 (G. E. Matson); female, Jackson, August 4, 1925 (G. E. Matson);

female, Jackson, August 12, 1925 (G. E. Matson); female, South Haven, July 19, 1925 (J. A. Harris, Jr.); female, Naubinway, Mackinac County, July 29, 1921 (T. H. Hubbell).

MINNESOTA: Female, La Crescent, July 13, 1922 (C. E. Mickel); female, Fort Snelling, June 28, 1923 (H. H. Knight); female, Fort Snelling, July 27, 1922 (C. E. Mickel); female, Fort Snelling, July 28, 1922 (A. A. Nichol); 11 females, Fridley sand dunes, Anoka County, June 24, 1923 (C. E. Mickel); 5 females, Fridley sand dunes, Anoka County, June 30, 1923 (H. H. Knight); female, Fridley sand dunes, Anoka County, July 3, 1923 (C. E. Mickel); 7 females, Fridley sand dunes, Anoka County, July 11, 1924 (R. W. Dawson); female, Fridley sand dunes, Anoka County, July 21, 1922 (C. E. Mickel); 3 females, Fridley sand dunes, Anoka County, July 26, 1923 (C. E. Mickel); 3 females, Fridley sand dunes, Anoka County, July 26, 1923 (R. W. Dawson); 2 females, Fridley sand dunes, Anoka County, July 28, 1922 (Paul Gilmer); 2 females, Fridley sand dunes, Anoka County, August 8, 1922 (C. W. Johnson); female, Fridley sand dunes, Anoka County, August 8, 1922 (A. T. Hertig).

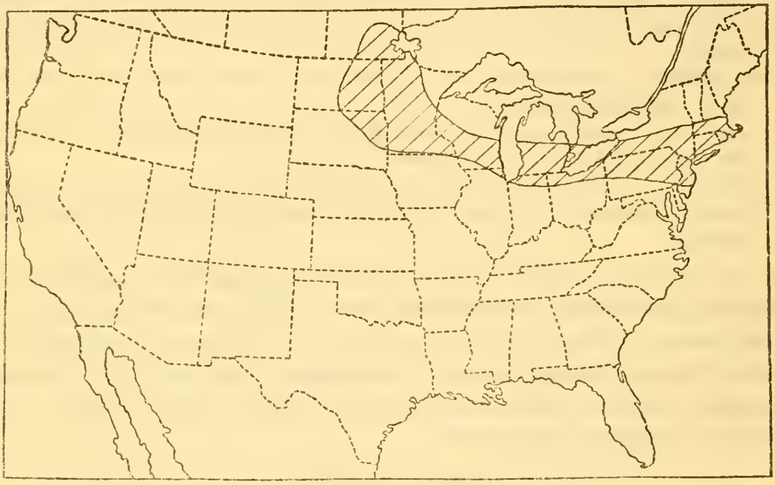

FIG. 19.—DISTRIBUTION OF DASYMUTILLA RUGULOSA (FOX)

NEW JERSEY: Female, Milltown, September 10, 1910; female, Camden County; female, North Woodbury, June 22, 1901; female, Westville, August 30; 2 females, Big Timber Creek, September 22, 1901; female, Lakehurst, August 22, 1914 (W. T. Davis); 5 females.

NEW YORK: Female, Cold Springs Harbor, L. I., June 19, 1921 (S. H. Emerson); female, Cold Springs Harbor, L. I., June 22, 1921 (E. G. Anderson); 2 females, Cold Springs Harbor, L. I., June 24, 1921 (E. G. Anderson); 2 females, Cold Springs Harbor, L. I., June 28, 1921 (E. G. Anderson); female, Cold Springs Harbor, L. I., June 28, 1921 (S. H. Emerson); 2 females, Cold Springs Harbor, L. I., July 9, 1921 (E. G. Anderson); female, Cold Springs Harbor, L. I., July 11, 1921 (E. G. Anderson); female, Cold Springs Harbor, L. I., July 12, 1921 (E. G. Anderson); female, Cold Springs Harbor, L. I., July 18, 1921 (S. H. Emerson); female, Cold Springs Harbor, L. I., July 22, 1921 (S. H. Emerson); female, Cold Springs Harbor, L. I., August 5, 1921 (S. H. Emerson); female, Cold

Springs Harbor, L. I., September 13, 1921 (E. G. Anderson); female, Sea Cliff, July.

NORTH DAKOTA: Female, Devil's Lake, August 11, 1920 (T. H. Hubbell); female, Steele, August 18, 1922 (O. A. Stevens); female, Breien, August 21, 1922 (O. A. Stevens).

SOUTH DAKOTA: Female, Brookings; female.

The form of the posterior portion of the head, the sparse black pubescence of the thoracic notum, the strongly sculptured propodeum and the black apical fringe of the second tergite are distinguishing characters of this species. Through the kindness of Dr. A. L. Melander I have had the opportunity of examining the type of *infensa* Melander and Brues, and find it to be the same as this species.

GROUP CASTOR

Males black with the second abdominal segment either maculated with, or entirely ferruginous, except *gibbosa* entirely black; second abdominal sternite with a median pit densely filled with hairs, except absent in *gibbosa;* last abdominal tergite without an apical fringe of short, erect hairs, except present in *hora;* tegulae glabrous, impunctate except the basal and inner lateral margins.

These males are grouped here because they probably represent the male sex of females included in the preceding group. *Permista* may prove to be the male of *quadriguttata*, while *rubricosa*, *hora*, *castor*, *meracula*, and *gentilis* are probably males of close allies to *quadriguttata. Gibbosa* is probably the male of *cariniceps.* When the sexes of the groups *quadriguttata* and *castor* have been correlated and more is known regarding their biology the present arrangement will undoubtedly have to be revised.

70. DASYMUTILLA PERMISTA Mickel

Plate 2, fig. 16

Mutilla castor Fox, Trans. Amer. Ent. Soc., vol. 25, p. 244, 1899, male.—MELANDER, Trans. Amer. Ent. Soc., vol. 29, p. 302, 1903, male (part).

Dasymutilla (*Dasymutilla*) *castor* BRADLEY, Trans. Amer. Ent. Soc., vol. 42, p. 326, 1916, male (part).

Dasymutilla permista MICKEL, 19th Rept. St. Ent. Minn., p. 108,. 1923, male.—HAYES, Bull. Brooklyn Ent. Soc., vol. 19, p. 153, 1924, male.

Holotype.—Male, Fridley sand dunes, Anoka County, Minn., July 28, 1922 (C. E. Mickel), in collection of University of Minnesota.

Distribution.—Florida, Virginia, Maryland, New Jersey, Connecticut, Rhode Island, Massachusetts, New York, Pennsylvania, Tennessee, Kentucky, Indiana, Illinois, Iowa, Minnesota, North Dakota, South Dakota, Nebraska, Kansas, Missouri, Arkansas, Mississippi, Louisiana, Texas, Oklahoma, and Colorado. (Fig. 20.)

SPECIMENS EXAMINED (IN ADDITION TO TYPE MATERIAL)

ARKANSAS: Male, Pine Bluffs, September, 1890.

COLORADO: Male, White Rocks, Boulder County, July 30 (Cockerell).

FLORIDA: Male, Lake Harney, May 4; 2 males, La Belle, May 8–10, 1916 (J. C. Bradley).

ILLINOIS: Male, McHenry, August (L. Melander).

INDIANA: Male, Sullivan, July 13, 1922 (J. J. Davis).

IOWA: 3 males, Ames; 2 males, Sioux City, July 8, 1921 (C. N. Ainslie); male, Sioux City, July 10, 1922 (C. N. Ainslie); 4 males, Sioux City, July 11, 1921 (C. N. Ainslie); male, Sioux City, July 13, 1922 (C. N. Ainslie); 6 males, Sioux City, July 15, 1922 (C. N. Ainslie); 3 males, Sioux City, July 29, 1921 (C. N. Ainslie); male, Sioux City, August 21, 1920 (C. N. Ainslie); 3 males. Sioux City, August 26, 1920 (C. N. Ainslie); 4 males, Sioux City, August 27, 1920 (C. N. Ainslie); male, Sioux City, September 7, 1920 (C. N. Ainslie).

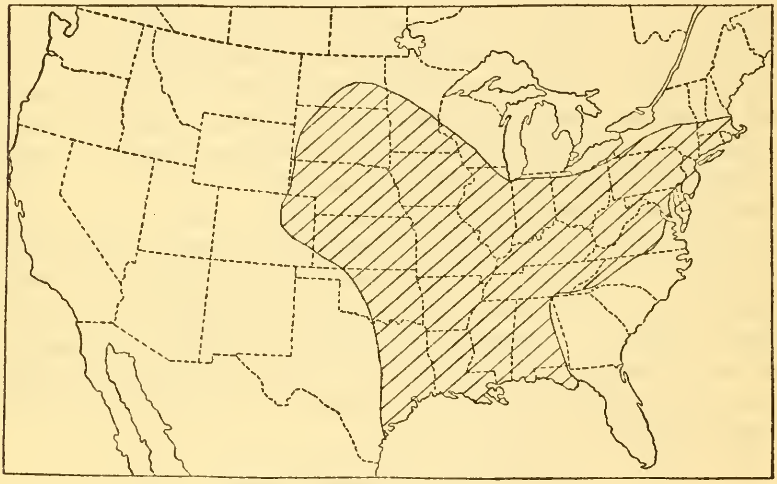

FIG. 20.—DISTRIBUTION OF DASYMUTILLA PERMISTA MICKEL

KANSAS: 14 males, Cherokee County, 1915 (R. H. Beamer); 4 males, Labette County (R. H. Beamer); male, Anderson County, 1915 (R. H. Beamer); male, Ottawa, July 13, 1923 (W. J. Brown); male, Wellsville, August 7, 1905; 2 males, Franklin County, 1915 (R. H. Beamer); male, Douglas County, July 1, 1922 (W. J. Brown); male, Douglas County, July 15, 1922 (W. J. Brown); male, Douglas County, July 20, 1921 (W. J. Brown); male, Douglas County, August 4, 1919 (W. E. Hoffmann); male, Manhattan; 2 males, Riley County, July (Marlatt); 2 males, Sumner County, 1916 (R. H. Beamer); 3 males, Osborne County, August 3, 1912 (F. X. Williams); male, Russell County, July 26, 1912 (F. X. Williams); male, Comanche County, 1916 (R. H. Beamer); 4 males, Kiowa County, July 5, 1911 (F. X. Williams); male, Kiowa County, July 6, 1911 (F. X. Williams); 2 males, Ellis County, July 19, 1912 (F. X. Williams); male, Rooks County, August 9, 1912 (F. X. Williams); male, Clark County, August 20, 1911 (F. X. Williams); male, Clark County, August 23, 1911 (F. X. Williams); 4 males, Meade County, July 10, 1911 (F. X. Williams); male, Trego

County, July 12, 1912 (F. X. Williams); male, Decatur County (F. X. Williams); 3 males, Rawlins County (F. X. Williams); male, Finney County, August, 1895 (H. W. Menke); male, Stanton County, July 30, 1911 (F. X. Williams); male, Wallace County (F. X. Williams); 10 males, Cheyenne County (F. X. Williams); male (Snow); 5 males (T. B. A.).

Kentucky: Male, Cumberland Gap (Geo. Dimmock).

Louisiana: 4 males.

Maryland: 3 males, Chestertown, August 4, 1902.

Massachusetts: Male, Nantucket, August 9, 1908 (C. W. Johnson); 2 males, Nantucket, August 19, 1909 (J. A. Cushman); 2 males, Chilmark, August 17, 1911 (J. A. Cushman); 3 males, Woods Hole, August, 1922 (E. G. Anderson); 2 males, Wellfleet, August 16, 1919 (C. W. Johnson).

Minnesota: Male, La Crescent, July 13, 1922 (C. E. Mickel); male, Olmstead County, (C. N. Ainslie); 2 males, Castle Rock, August 20, 1922 (F. C. Fletcher); male, Jordan, August 13, 1923 (A. T. Hertig); male, Jordan, July 13, 1923 (C. E. Mickel); male, Barden sand dunes, Scott County, July 29, 1923 (R. W. Dawson); male, St. Anthony Park, July 23, 1923 (H. H. Knight); 2 males, Fridley sand dunes, Anoka County, July 3, 1923 (C. E. Mickel); male, Fridley sand dunes, Anoka County, July 12, 1923 (C. E. Mickel); male, Fridley sand dunes, July 19, 1923 (C. E. Mickel); 2 males, Fridley sand dunes, Anoka County, July 26, 1923 (C. E. Mickel); 4 males, Fridley sand dunes, Anoka County, August 3, 1924 (R. W. Dawson).

Mississippi: Male, Pickayune, summer, 1915 (Bob H. Batty); male, Lumberton, August 11, 1915 (R. C. Miner); male, Mount Olive, September, 1915 (H. L. Miller); male, Agricultural College, June 27, 1915 (R. C. Miner); male, Buena Vista, August 12, 1916 (H. L. King); male, Houlka (J. R. Hamilton).

Missouri: Male, Hollister, August 12, 1912 (H. H. Knight); male, Springfield, July 16, 1912 (H. H. Knight); male, Springfield, July 23, 1912 (H. H. Knight); 2 males.

Nebraska: Male, Lincoln, July 15, 1920 (R. W. Dawson); 4 females, Niobrara, August 10, 1923 (H. C. Severin); male, Pine Ridge, July; 6 males, Halsey, August 9, 1925 (R. W. Dawson); 2 males, Halsey, August 11, 1925 (R. W. Dawson); 4 males, Halsey, August 12, 1925 (R. W. Dawson); 4 males, Halsey, August 13, 1925 (R. W. Dawson); 3 males, Halsey, August 14, 1920 (C. B. Phillip); male, Halsey, August 14, 1925 (R. W. Dawson); 3 males, Halsey, August 15, 1925 (R. W. Dawson); 2 males, Halsey, August 19, 1920 (C. B. Philip); 2 males, Halsey, August 20, 1920 (C. B. Philip); 5 males, Halsey, September 3, 1924 (R. W. Dawson).

New Jersey: 10 males, Menantico, July 27, 1923 (J. C. Bradley); 2 males, Wilson's Landing, July 26, 1923 (J. C. Bradley); male, Reega, July 26, 1923 (J. C. Bradley); male, Merchantville, July 15; male.

New York: Male, Central Park, L. I., August; 2 males, Selden, L. I., August 30, 1916 (W. T. Davis); male, Yaphank, August 21, 1916 (W. T. Davis); male, Cold Springs Harbor, L. I., July 9, 1921 (E. G. Anderson).

North Dakota: Male, Steele, August 18, 1922 (O. A. Stevens); male, Cannon Ball, August 20, 1922 (O. A. Stevens).

Oklahoma: Male, Payne County, June 13, 1925 (W. J. Brown); male, Payne County, July 5, 1925 (W. J. Brown).

Pennsyvania: Male, Philadelphia, August, 1916 (Carl Ilg); male, Delaware County, August 12, 1897; 2 males, Castle Rock, July 18, 1901; male, Rockville, August 15, 1925.

Rhode Island: Male, Buttonwoods, July 25, 1911 (C. W. Johnson).

South Dakota: 2 males, Yankton, August 6, 1923 (H. C. Severin); 3 males, Ravinia, August 10, 1922 (C. N. Ainslie); male, Fairfax, August 8, 1923 (H. C. Severin); male, Bruce, August 24, 1923 (H. C. Severin); male, Bigstone, August 20, 1924 (H. C. Severin); male, Philip, September 3, 1924 (H. C. Severin); male, Rapid City, September 9, 1923 (H. C. Severin); male, Martin, September 3, 1924 (H. C. Severin); male, Lake Albert, August 22, 1923 (H. C. Severin); male.

Tennessee: Male, Allardt, Fentress County, August 16, 1922 (T. H. Hubbell).

Texas: 2 males, Victoria, June 25, 1917; male, Wharton, June 24, 1917; 4 males, Richmond, June 22, 1917; male, Beaumont, August, 1918 (G. E. Riley); male, Lee County, June, 1908; male, Lee County, September 11, 1905; male, Fedor; male, southeast Texas, summer, 1918 (W. W. DeCell); male, Trinity, July 24, 1907 (W. W. Yothers); male, Calvert, June 27, 1907 (F. C. Bishopp); 2 males, Rosser, June 28, 1905 (C. R. Jones); male.

Virginia: 2 males, Falls Church, August 7; male.

Permista is one of the species placed under the name *castor* in collections. The type of *castor* has been examined and found to be distinct from this species. It is possible that the material placed here under *permista* represents two distinct species. The puncturation of the second abdominal tergite varies a great deal. In some specimens the punctures are large and almost contiguous, while in others the punctures are fine and well separated. This difference is not tangible enough, except in extreme cases, to be used as a basis for specific differences, and since no other evidence could be found to establish the presence of more than one species, the type material and the specimens listed here are regarded as a single species for the present. When quantitative data on the life history and host relationships can be procured the question as to whether one or more species are present here can probably be settled. Hayes (1924) has reared this species from the cocoons of *Elis quinquecincta* Fabricius. The specimens vary in length from 8 mm. to 15 mm.

71. DASYMUTILLA RUBRICOSA, new species

Plate 2, fig. 10

Male.—Black, with the first and second abdominal segments red; sometimes the thorax and propodeum more or less reddish; lateral margins of second tergite glabrous, impunctate, bare. Length, 14 mm.

Head black, sparsely clothed with long, erect, black pubescence; mandibles tridentate at the apex; clypeus bidentate medially on the cephalic margin, coarsely rugoso-punctate, scape bicarinate beneath, rugosely punctate throughout; first segment of flagellum five-sixths as long as the second; antennal scrobes carinate above; front coarsely, confluently punctate throughout; vertex and genae with the punctures less coarse and mostly contiguous, rather than confluent; relative widths of head and thorax 7.5–9.5.

Thorax black, somewhat tinged with red, sparsely clothed throughout with long, erect, black pubescence; junction of the cephalic face and dorsum of pronotum rounded; pronotum, mesonotum, scutellum and metanotum coarsely, confluently punctate, appearing rugoso-punctate; propleura with large coarse punctures anteriorly, intermixed coarse and fine punctures posteriorly; mesopleura with coarse contiguous punctures intermixed with very small, fine punctures; metapleura glabrous, impunctate except for a few large scattered punctures on the ventral third; metapleura clothed with sparse, short, blackish pubescence; sides of propodeum with very large, coarse, contiguous punctures, almost foveolate; posterior face and dorsum of propodeum very coarsely, deeply and irregularly foveolate; tegulae glabrous, impunctate except the cephalic third and inner lateral margin with very close, coarse punctures, the punctate area bearing long, coarse, black hairs.

Abdomen black, except the first and second segments ferruginous; first tergite very broad at the apex and strongly constricted subapically; disk of first tergite glabrous, with a few scattered punctures, laterally and apically with coarse, confluent punctures, sparsely clothed throughout with very long, erect, black pubescence; second tergite with small, slightly elongate punctures, separated by from one to two times their own diameter; narrow lateral margins of second tergite glabrous, impunctate, bare; second tergite sparsely clothed with very long, erect black pubescence, except a pair of obscure subapical spots on the disk with the pubescence ferruginous, and moderately thick apical fringe of long, black hairs; tergite 3 ferruginous; tergites 4–6 black; tergites 3–6 with moderate, close punctures, sparsely clothed with long, erect, black pubescence; ultimate tergite punctate and pubescent at the base, the pygidial area distinct and bare, slightly longitudinally rugose; first sternite with a prominent, longitudinal, median carina, very coarsely, confluently and deeply punctate, sparsely clothed with very long, black pubescence; second sternite with a median, very elongate, ovate pit, densely filled with ferruginous pubescence; remainder of sternite with distinct, elongate, moderate punctures, sparsely clothed with erect, black pubescence; sternites 3–6 densely, closely punctate at the apical margins; ultimate sternite with moderate, shallow, separated punctures; sternites 2–6 with a thin, apical fringe of long, black hairs.

Wings dark fuliginous; cell 2nd R_1+R_2 broadly truncate at the apex; cell R_4 almost obsolete; vein M_{3+4} received by cell R_5 one-third the distance from the base to the apex; veins r–m and R_5 widely separated on vein r.

Holotype.—Male, South Bay, Lake Okeechobee, Fla., April 20, 1912, in collection of American Museum of Natural History.

Distribution.—New Jersey, Maryland, Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, Tennessee, Mississippi, Louisiana, Arkansas, and Texas. (Fig. 21.)

PARATYPE MATERIAL

ALABAMA: 3 males, Cowarts, August 1–3, 1916; 2 males, Dothen, July 31, 1916; 2 males, Auburn, July 10, 1900; 3 males, Thomasville, June 11, 1919 (H. H. Knight).

ARKANSAS: Male.

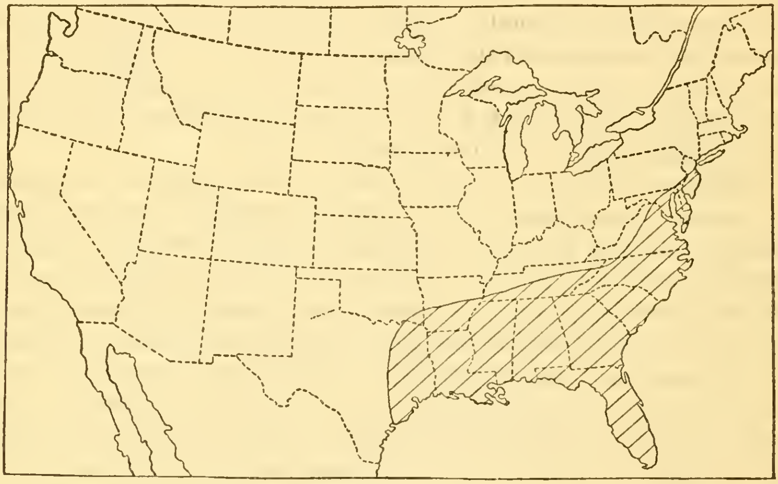

FIG. 21.—DISTRIBUTION OF DASYMUTILLA RUBRICOSA, NEW SPECIES

FLORIDA: Male, Miami, April 3 (J. N. Knull); 3 males, Marco, April 20, 1912; 6 males, Fort Myers, May 7, 1916 (J. C. Bradley); male, Gulfport, April (Reynolds); male, St. Petersburg, April 28, 1908 (Van Duzee); male, Tampa, May 2, 1908 (Van Duzee); 2 males, Kissimmee; male, Orlando, May 28, 1925 (O. C. McBride); male, Sanford, April 27, 1908 (Van Duzee); male, Sanford, May 6, 1908 (Van Duzee); male, Gainesville, May 2, 1911; male, Gainesville, May 2, 1923 (Alexander Walker); male, Gainesville, May 18, 1923 (Alexander Walker); male, Gainesville, May 21, 1914; male, Gainesville, September 16, 1918 (P. W. Fattig); male, Gainesville, October 21, 1922 (F. W. Walker); male, Jacksonville; 6 males, LaBelle, May 8–10, 1916 (J. C. Bradley); 3 males.

GEORGIA: Male, St. Simon's Island, June 10, 1910; male, St. Simon's Island, September 9, 1909; 2 males, Billy's Island, Okefenokee Swamp, June, 1912; male, Thomasville, July 22–26, 1916; male, Thomasville, July 25, 1916; male, Bainbridge, July 15–27, 1909 (J. C. Bradley); 4 males, Bainbridge, September 17–October 19, 1910 (J. C. Bradley); 2 males, between Bainbridge and Climax, July 28, 1916; male, Valdosta, July 20–21, 1916; 10 males, Spring Creek, Decatur County, June 7–23, 1911 (J. C. Bradley); 21 males, Spring Creek, Decatur County, July 16–29, 1912 (J. C. Bradley); male, Spring Creek, Decatur County, August 26–28, 1913; male, Spring Creek, Decatur County, September 23–October 3, 1910 (J. C. Bradley); male, Spring Creek, Decatur County; male, Chester, June 14, 1904; male, Warm Springs, July 31, 1910 (J. C. Bradley); 2 males, Atlanta, July 6, 1909; 2 males, Stone Mountain, August 3, 1913; male, Silver Lake, Fulton County, August 10, 1913; 4 males, Austell, August 28, 1910; male, Lavender, Floyd County, August 23, 1910 (J. C. Bradley); male, Toccoa, August 15, 1909; 5 males, Tallulah Falls, June 19–25, 1910 (J. C. Bradley); male, Cornelia; 3 males, Dalton, August 29, 1910; 18 males.

LOUISIANA: Male, Logansport, June 8, 1906 (W. D. Pierce); male, Keatchie, June 14, 1905; male.

MARYLAND: Male, River View, June 29, 1898 (F. C. Pratt).

MISSISSIPPI: 4 males, Ocean Springs, June 5, 1915 (F. F. Bibby); male, Ocean Springs, June 7, 1915 (C. E. Wilson); male, Ocean Springs, June 12, 1915 (F. F. Bibby); male, Ocean Springs, June, 1915 (F. F. Bibby); male, Lumberton, August 11, 1915 (R. C. Miner); male, Carthage, June 18, 1921 (T. M. Gross); male, Carthage, June 23, 1921 (T. M. Gross); male, Star, August 2, 1921 (C. E. Ross).

NEW JERSEY: 2 males, Manumuskin, August 17, 1902 (E. Daecke); male, Menantico, July 27, 1923; 2 males, Wilson's Landing, July 26, 1923; male, Wilson's Landing, July 26, 1923 (J. C. Bradley); male, Reega, July 26, 1923; male, Cassville, August 17, 1910; 3 males, North Woodbury, August 1, 1901; male, Camden County, August 24, 1910; male, Riverton, July 7, 1901; male, Riverton, August 11, 1901; male, DaCosta, July 16, 1900; male, DaCosta, July 18, 1902 (E. Daecke); male, DaCosta, July 25, 1923; male, Lakehurst, August 16, 1912; male, August 10, 1890.

NORTH CAROLINA: 3 males, Beaufort, June 18, 1903 (F. Sherman); male, Beaufort, August 11, 1902 (F. Sherman, jr.); male, Havelock, June 19–24, 1905 (F. Sherman); male, Greenville, July 6, 1906 (R. S. Woglum); male, Ivanhoe, July, 1907 (L. M. Smith); male, Overhills, August 23, 1914 (J. E. Eckert); male, Raleigh, July 30, 1912 (C. S. Brimley); male, Raleigh, early August (C. L. Metcalf); male, Raleigh, August 12, 1904 (C. S. Brimley); male, Raleigh, August 18, 1902 (C. O. Houghton); male, Raleigh, September 9, 1904 (G. M. Bentley); male, Newton, July 28, 1904 (G. M. Bentley); male.

TENNESSEE: Male, Chattanooga, July 4, 1922 (T. H. Hubbell).

SOUTH CAROLINA: Male, Calhoun (E. S. G. Titus).

TEXAS: Male, Rock Island, June 9, 1922 (Grace O. Wiley); 3 males, Trinity, August 24, 1907 (W. W. Yothers); male, Mexia, July 11, 1907 (S. Goes); male, Jacksonville, June 28, 1906 (F. C. Bishopp); 2 males, Jacksonville, August 11, 1906 (F. C. Bishopp); 5 males, Overton, August 22, 1907 (W. W. Yothers); male, Pittsburg, August 26, 1904 (F. C. Bishopp); male, Mineola, June 26 (F. C. Bishopp); 5 males, Mineola, July 19 (F. C. Bishopp); 2 males, Mineola, July 19 (C. R. Jones); male Mineola, August 6, 1904 (C. R. Jones); male, Rosser, July 6, 1905 (C. R. Jones); male, Rosser, September 23, 1905 (C. R. Jones).

VIRGINIA: Male, Seven Pines, August 8, 1916 (W. T. Davis); male, Falls Church, July 16, 1913 (W. Middleton); male, Rosslyn, July 11, 1913 (R. C. Shannon); male, Virginia Beach, August 31, 1903; male, July 23, 1882.

Paratypes are deposited in the collections of the American Museum of Natural History, United States National Museum, American Entomological Society of Philadelphia; Cornell University, University of Michigan, University of Minnesota, Mississippi Agricultural College, North Carolina Agricultural College, Iowa State College, Bureau of Plant Industry, Pennsylvania Department of Agriculture; Canadian Department of Agriculture, O. A. Stevens, and the author.

The paratypes vary in color to some extent; in northern and western specimens the thorax is entirely black, and in some specimens the first abdominal segment is partly or entirely black. The hairs in the pit on the second abdominal sternite are often black. The specimens vary in length from 9 mm. to 14 mm.

This species is very closely related to *permista* Mickel. It has been placed under the name *castor* in collections. It differs from *permista* in having the second tergite less coarsely punctate, the lateral margins of the second tergite glabrous, impunctate and bare, rather than microscopically punctate and finely pubescent, and in having the second abdominal segment entirely ferruginous rather than mostly black. It is probably the male of either *allardi* or *cypris.*

72. DASYMUTILLA HORA, new species

Plate 2, fig. 15

Male.—Black, except first and second abdominal segments ferruginous; anterior margin of pronotum distinctly emarginate; second sternite with an elongate, ovate pit densely filled with hairs, on the anterior third. Length, 13 mm.

Head black; sparsely clothed with long, erect, black pubescence; mandibles tridentate at the apex; clypeus bidentate medially on the anterior margin, the disk moderately, confluently punctate; scape bicarinate beneath, coarsely, closely punctate; first segment of the flagellum four-fifths the length of the second; antennal scrobes carinate above; front coarsely, confluently punctate; vertex with moderate, contiguous, shallow punctures; genae with small, mostly separated, shallow punctures; occiput with moderate lateral depressions leaving a broad, median elevated area, punctured like the vertex; relative widths of head and thorax, 7–8.5.

Thorax black, sparsely clothed with long, erect, black pubescence; anterior margin of the pronotum slightly emarginate medially, the cephalic surface of the emargination glabrous, impunctate; pronotum, mesonotum, scutellum and metanotum with contiguous, more or less confluent punctures; propleura with large, confluent punctures anteriorly, scattered punctures near the posterior margin; mesopleura with large, deep, contiguous punctures throughout, the punctures on the disk larger than those near the margins; ventral third of metapleura with large, contiguous punctures, dorsal two-thirds glabrous impunctate; sides of propodeum with large, confluent punctures anteriorly, becoming irregularly foveolate posteriorly; posterior face and dorsum of propodeum deeply, irregularly foveolate; anterior and inner lateral marginal areas of tegulae punctate, the remainder of the surface glabrous, impunctate.

Abdomen black, except the first and second segments ferruginous, the second tergite with a pair of poorly defined large spots on the apical half lighter in color than the rest of the tergite; first tergite with large, shallow contiguous and confluent punctures, except on the disk the punctures less numerous, and separated, the tergite strongly constricted subapically, sparsely clothed with long, erect, black pubescence; second tergite with distinct, elongate, moderate punctures throughout, the punctures shallow anteriorly, deep posteriorly, clothed with long, erect, black pubescence, except the pubescence on the lighter spots of the apical half yellowish; tergites 3–6 with moderate, deep contiguous punctures, sparsely clothed with long, erect, black pubescence and each with an apical fringe of black hairs; ultimate tergite punctate and pubescent on the anterior fourth, pygidial area bare, more or less irregularly rugose; first sternite with a distinct median longitudinal carina, with large, contiguous punctures throughout, sparsely clothed with long, erect, black pubescence; second sternite with an elongate, ovate, median pit densely filled with black hairs, on the anterior third, with large, distinct, slightly elongate punctures throughout, sparsely clothed with long, erect, black pubescence and with an apical fringe of black hairs; sternites 3–6 with moderate, scattered punctures, each with an apical fringe of black hairs; ultimate sternite with distinct moderate punctures throughout.

Legs black, sparsely clothed with long, erect, black pubescence.

Wings dark fuliginous; cell 2nd $R_1 + R_2$ broadly truncate at the apex; cell R_4 almost obsolete; vein M_{3+4} received by cell R_5 at about one-half the distance from the base to the apex; veins r–m and R_5 widely separate on vein r.

Holotype.—Male, Thomasville, July 22–26, 1916, in collection of American Museum of Natural History.

Distribution.—Florida, Georgia, Mississippi, and West Virginia.

PARATYPE MATERIAL

FLORIDA: Male, Sanford, April 30, 1908 (Van Duzee); male, Crescent City, April 19, 1908 (Van Duzee); male, Gainesville, May 3, 1922; male, Gainesville, May 6, 1922 (T. P. Winter); male, Gainesville, May 15, 1914; male, Gainesville, May 16, 1914; male, Gainesville, November 20, 1921; male, Gainesville (J. R. W.); male, Lake City, May 30, 1892; male, LaBelle, April 27, 1912; 8 males, LaBelle, May 8–10, 1916 (J. C. Bradley); 2 males.

GEORGIA: 2 males, St. Simon's Island, June 8, 1911; 2 males, St. Simon's Island, June 10, 1911; male, St. Simon's Island, June 11, 1911; 3 males, Billy's Island, Okefenokee Swamp, June, 1912; male, Thomasville, July 22–26, 1916; 10 males, Spring Creek, Decatur County, May 18–21, 1916 (J. C. Bradley); male, Spring Creek, Decatur County, June 7–23, 1911 (J. C. Bradley); 6 males, Spring Creek, Decatur County, July 16–29, 1912; 9 males.

MISSISSIPPI: 2 males, Ocean Springs, July 5, 1915 (F. F. Bibby).

WEST VIRGINIA: 11 males, Millville (J. C. Bradley).

Paratypes are deposited in the collections of the United States National Museum, American Museum of Natural History, University of Michigan, University of Minnesota, Cornell University, Mississippi Agricultural and Mechanical College, and the American Entomological Society of Philadelphia.

This species resembles *rubricosa* very much in general appearance and color; it may be readily distinguished from that species by the basal position of the pit on the second sternite, the emarginate anterior margin of the pronotum and the lateral depressions of the occiput.

A gynandromorph of this species was collected at Spring Creek, Ga., May 18–21, 1916, by Dr. J. C. Bradley (see p. 28). The first four segments of the abdomen which present female characters are very similar to those of *cypris* (Blake) and strengthens my belief that this will prove to be the male of that species.

73. DASYMUTILLA CASTOR (Blake)

Plate 2, fig. 13

Mutilla (*Sphaerophthalma*) *castor* BLAKE, Trans. Amer. Ent. Soc., vol. 3, p. 237, 1871, male.

Mutilla castor BLAKE, Trans. Amer. Ent. Soc., vol. 7, p. 244, 1879, male.—DALLE TORRE, Cat. Hymen., vol. 8, p. 22, 1897, male.

Sphaerophthalma castor BLAKE, Trans. Amer. Ent. Soc., vol. 13, p. 227, 1886, male.

Ephuta (*Ephuta*) *castor* ANDRÉ, Gen. Ins., vol. 1, fasc. 11, p. 58, 1903, male.

Lectotype.—Male, Texas, in collection of American Entomological Society of Philadelphia.

Plesiotype.—Male, Bainbridge, Ga., June 2, 1911 (J. C. Bradley), in collection of Cornell University.

Distribution.—Georgia.

SPECIMENS EXAMINED

GEORGIA: Male, Bainbridge, September 3–7, 1910 (J. C. Bradley); male, Bainbridge, September 17–October 10, 1910 (J. C. Bradley); male, Spring Creek, Decatur County, May 18–21, 1916 (J. C. Bradley); male, Spring Creek, Decatur County, July 16–29, 1912; male, Spring Creek, Decatur County, September 23–October 3, 1910 (J. C. Bradley); 2 males, Albany, September 1, 1910; male, Toccoa, August 18; male.

I have examined the specimen in the collection of the American Entomological Society of Philadelphia designated as the lectotype of this species and the specimens placed here are identical with it. The lectotype is from Texas according to the locality label, but I have some doubts as to whether the locality label is correct, since all the specimens I have seen are from Georgia. This species has been misidentified in all collections. The lectotype has remained a unique up to the present time and all printed records of *castor* are erroneous.

This species is closely related to *permista*, *rubricosa*, and *meracula*. It differs from all three in having the pit on the second sternite basal in position. It may be separated from *permista* and *meracula* by the ferruginous first and second abdominal segments. The emarginate anterior margin of the pronotum and the lateral depressions of the occiput distinguish it from *permista* and *rubricosa*. The absence of an apical fringe of hairs on the pygidium separates it at once from *hora* which it resembles superficially. The genitalia are distinct from those of any of the above species.

74. DASYMUTILLA GENTILIS, new species

Plate 2, fig. 14

Male.—Entirely black, except apical two-thirds of second abdominal tergite ferruginous; occiput with broad, deep, lateral depressions, leaving a median elevated area; anterior margin of pronotum emarginate medially, forming a small, median tubercle; cephalic surface of the emargination glabrous; posterior declivity of tegulae setigerously punctate. Length, 13 mm.

Head black, sparsely clothed with long, erect, black pubescence; mandibles tridentate at the apex; clypeus strongly bidentate medially on the cephalic margin, the disk coarsely rugoso-punctate; scape bicarinate beneath, coarsely and closely punctate; first segment of flagellum four-fifths the length of the second; antennal scrobes distinctly carinate above; front very coarsely, confluently punctate; vertex and genae with coarse, contiguous punctures; occiput broadly, deeply depressed laterally, forming a median area conspicuously elevated; the latter with close, elongate punctures; relative widths of head and thorax, 7.5–9.5.

Thorax black, sparsely clothed throughout with long, erect, black pubescence; pronotum distinctly emarginate medially on the anterior margin, forming a conspicuous, glabrous, triangular area on the cephalic face of the pronotum, the uppermost angle of the triangle forming a small, median tubercle; dorsum of pronotum rounded into the cephalic face of same except medially; pronotum, mesonotum, scutellum, and metanotum with very coarse, deep and confluent punctures; propleura with coarse punctures anteriorly, and intermixed coarse and fine punctures posteriorly; mesopleura with coarse, mostly separated, shallow punctures, intermixed with fine punctures anteriorly; metapleura glabrous, impunctate, except the ventral third with large, coarse punctures; sides of propodeum glabrous, impunctate at the anterior margin; coarse, separated punctures medially, coarse confluent punctures at the posterior margin; posterior face and dorsum of propodeum deeply and irregularly foveolate; tegulae glabrous, impunctate on the disk, closely punctate on the basal, lateral, and posterior declivities; the punctate areas bearing long, coarse, black hairs.

Abdomen black, the apical two-thirds of tergite two ferruginous; first tergite very coarsely, confluently punctate throughout, the punctures coarser and more scattered on the disk, strongly constricted subapically, clothed with very long, erect black pubescence; second tergite with large, separated punctures throughout, clothed with long, erect, black pubescence, except the ferruginous area with large lateral spots of yellowish pubescence; apical margin of tergite two with a thick apical fringe of black hairs; tergites 3–6 with large, deep, contiguous punctures, clothed with long, erect, black pubescence and with apical fringes of black pubescence; ultimate tergite punctate and pubescent on the basal margin, the pygidial area glabrous, inconspicuously longitudinally rugose; first sternite with a conspicuous, median, longitudinal carina, very coarsely, confluently punctate, sparsely clothed with long, black pubescence; second sternite with very distinct, large, elongate punctures throughout, the punctures close and confluent basally; a median narrow, elongate pit on the basal half of the second sternite, densely packed with hairs, the posterior tip of the pit not extending onto the posterior half of the sternite; second sternite sparsely clothed with long, erect, black pubescence and a thin apical fringe of black pubescence; sternites 3–6 with scattered punctures at the apical margin, clothed with sparse, long, erect, black pubescence, and each with an apical fringe of black pubescence; ultimate tergite with scattered punctures and sparse, long, black pubescence.

Legs black, clothed with black pubescence.

Wings dark fuliginous; cell 2nd R_1+R_2 broadly truncate at the apex; cell R_4 almost obsolete; vein M_{3+4} received by cell R_5 at one-third the distance from the base to the apex; veins r–m and R_5 widely separated on vein r.

Holotype.—Male, Cat. No. 40738, U.S.N.M., Victoria, Texas, June 3, 1910 (J. D. Mitchell).

This species is related to *permista* and *rubricosa* but is easily distinguished by having the posterior declivity of the tegulae punctured and by the occipital and pronotal characters mentioned above. The pit on the second sternite is more basal in position than in either of the two other species. It differs from *castor* in having the pronotum more strongly emarginate medially on the cephalic margin, the punctate tegulae, and in having the pit on the second sternite much less developed.

75. DASYMUTILLA MERACULA, new species

Plate 3, fig. 19

Male.—Black, except second abdominal tergite mostly ferruginous; occiput with moderate lateral depressions; anterior margin of pronotum emarginate medially, the cephalic surface of the emargination glabrous; dorsum of pronotum not evenly rounding into the cephalic surface medially; posterior surface of tegulae impunctate. Length, 15 mm.

Head black, sparsely clothed with long, erect, black pubescence; mandibles tridentate at the apex; clypeus bidentate medially on the cephalic margin, the disk closely and confluently punctate; scape bicarinate beneath, coarsely and confluently punctate; first segment of the flagellum four-fifths the length of the second; antennal scrobes carinate above; front coarsely, deeply, and confluently punctate; vertex and genae with moderate contiguous punctures; occiput with moderate lateral depressions, leaving a broad median elevated area, punctured like the vertex; relative widths of head and thorax, 7.5–9.

Thorax black, sparsely clothed with long, erect, black pubescence; anterior margin of pronotum emarginate medially, not forming a tubercle as in *gentilis*, the cephalic surface of the emargination glabrous; pronotum, mesonotum, scutellum, and metanotum coarsely, deeply, and confluently punctate; propleura with coarse, close punctures anteriorly, moderate, scattered punctures posteriorly, interspersed with very fine punctures; mesopleura with very large, coarse, more or less confluent punctures, interspersed anteriorly with very fine punctures; ventral third of metapleura with close, coarse punctures, dorsal two-thirds glabrous, impunctate; anterior portion of sides of propodeum with large, contiguous punctures, posteriorly coarsely, confluently foveolate; posterior face and dorsum of propodeum coarsely, deeply, irregularly foveolate; anterior third and inner lateral third, coarsely, closely punctate, remaining surface glabrous, impunctate.

Abdomen black, the second tergite ferruginous except narrow basal and apical margins; first tergite distinctly constricted subapically, with coarse, more or less confluent punctures throughout; second tergite with moderate, deep, slightly elongate, contiguous punctures on the anterior third, similar but separated punctures on the posterior two-thirds, clothed with sparse, long, erect pubescence and a thick, apical fringe of black hairs, the pubescence black on the black portion of the tergite, yellowish on the ferruginous portion; tergites 3–6 with moderate, deep, contiguous punctures throughout, sparsely clothed with long, erect, black pubescence and each with a fringe of black hairs; ultimate tergite contiguously punctate, and pubescent on the basal fourth, pygidial area bare, longitudinally rugose; first sternite with a distinct median longitudinal carina, coarsely, confluently punctate, sparsely clothed with long, erect, black pubescence; second sternite with large, distinct, elongate punctures throughout, and with an elongate, ovate pit densely packed with hairs very slightly anterior to the median point of the sternite, sparsely clothed with long, erect, black pubescence and with a thin apical fringe of black hairs; sternites 3–6 with small, scattered punctures, and each with an apical fringe of black hairs; ultimate sternite with moderate distinct punctures.

Legs black, sparcely clothed with black pubescence.

Wings dark fuliginous; cell 2nd R_1+R_2 broadly truncate at the apex; cell R_4 almost obsolete; vein M_{3+4} received by cell R_5 at one-third the distance from the base to the apex; veins r–m and R_5 widely separated on vein r.

Holotype.—Male, Comanche County, Kansas, 1915 (R. H. Beamer), in collection of University of Kansas.

Paratypes.—Male, Seward County, Kansas, August 16, 1911 (F. X. Williams); male, Lee County, Texas, September 11, 1905; 2 males, Lee County, Texas, September 18, 1905; male, Lee County, Texas, September 22, 1905; male, Cuero, Texas (Townsend); in collections of University of Minnesota, University of Kansas, and the author.

This species is rather difficult to distinguish from *permista* on external characters, although the characters of the genitalia are readily recognized. The occiput has moderate lateral depressions which are practically obsolete in *permista;* the anterior margin of the pronotum is slightly emarginate medially, and the dorsum medially therefore does not round evenly into the cephalic surface of the pronotum as it does in *permista;* the pit on the second sternite occupies a more basal position than it does in *permista.* Superficially it is much like *gentilis* but the latter has the tegulae more punctured, the lateral depressions of the occiput broader and more pronounced, and the median emargination is much more distinct, forming a tubercle.

76. DASYMUTILLA GIBBOSA (Say)

Plate 3, fig. 18

Mutilla gibbosa SAY, Bost. Journ. Nat. Hist., vol. 1, p. 298, 1836, male.—LECONTE, Writ. of Th. Say, vol. 2, p. 741, 1859, male.—BLAKE, Trans. Amer. Ent. Soc., vol. 7, p. 244, 1879, male.—DALLE TORRE, Cat. Hymen., vol. 8, p. 43, 1897, male.—FOX, Trans. Amer. Ent. Soc., vol. 25, p. 246, 1899, male.—?MELANDER, Trans. Amer. Ent. Soc., vol. 29, p. 302, 1903, male.

Mutilla (*Sphaerophthalma*) *gibbosa* BLAKE, Trans. Amer. Ent. Soc., vol 3, p. 240, 1871, male.

Sphaerophthalma gibbosa BLAKE, Trans. Amer. Ent. Soc., vol. 13, p. 231, 1886, male.

Ephuta (*Ephuta*) *gibbosa* ANDRÉ, Gen. Ins., vol. 1, fasc. 11, p. 60, 1903, male.

Dasymutilla (*Dasymutilla*) *gibbosa* BRADLEY, Trans. Amer. Ent. Soc., vol. 42, p. 322, 1916, male.

Dasymutilla gibbosa ROHWER, Bull. 22, Conn. Geol. Nat. Hist. Surv., p. 624, 1916, male.—MICKEL, 19th Rep. State Ent. Minn., p. 106, 1923, male.

Neotype.—Male, Middletown, N. Y., July 2–20, 1910 (Ch. Spooner), in collection of Cornell University.

Distribution.—Massachusetts, Connecticut, New York, Michigan, Indiana, Illinois, and Minnesota.

SPECIMENS EXAMINED

MICHIGAN: Male, Dexter, July 18, 1923 (E. G. Anderson).

MINNESOTA: Male, Chisago County, July 18, 1911.

NEW YORK: Male, Cold Springs Harbor, L. I., July 16, 1921 (S. H. Emerson); male, Ithaca, July 27, 1886 (A. M. Shaw); male, Rhinebeck, July 27, 1907 (C. R. Crosby).

Easily recognized by the entirely black body sparsely clothed with grayish pubescence. Judging from the Mutillid fauna of Minnesota *cariniceps* is probably the female of this species. This is in agreement with Bradley's (1916) suggestion. This species is not closely related to the preceding males.

GROUP CANEO

Females small, varying in length from 4.5 to 10 mm., head as wide as the thorax; postero-lateral angles very weakly, obscurely tuberculate (the tubercle is limited to the occipital margin, is much reduced and indistinct); head and thorax more or less clothed with silvery pubescence; sometimes thickly so; thorax long, subrectangular; scutellar scale present; pygidium longitudinally striate. Males unknown but probably belong to the following group.

77. DASYMUTILLA CANEO (Blake)

Mutilla caneo BLAKE, Trans. Amer. Ent. Soc., vol. 7, p. 250, 1879, female.—DALLE TORRE, Cat. Hymen., vol. 8, p. 20, 1897, female.—Fox, Trans. Amer. Ent. Soc., vol. 25, p. 240, 1899, female.

Mutilla mixtura BLAKE, Trans. Amer. Ent. Soc., vol. 7, p. 251, 1879, female.—DALLE TORRE, Cat. Hymen., vol. 8, p. 63, 1897, female.

Sphaerophthalma mixtura BLAKE, Trans. Amer. Ent. Soc., vol. 13, p. 234, 1886, female.

Sphaerophthalma caneo BLAKE, Trans. Amer. Ent. Soc., vol. 13, p. 241, 1886, female.

Mutilla myrrha Fox, Trans. Amer. Ent. Soc., vol. 25, p. 258, 1899, female.
Ephuta (*Ephuta*) *caneo* André, Gen. Ins., vol. 1, fasc. 11, p. 58, 1903, female.
Ephuta (*Ephuta*) *myrrha* André, Gen. Ins., vol. 1, fasc. 11, p. 62, 1903, female.
Dasymutilla caneo Mickel, 19th Rept. State Ent. Minn., p. 102, 1923, female.

Type.—Female, Texas, in collection of the American Entomological Society of Philadelphia. The types of *mixtura* and *myrrha* are in the collection of the American Entomological Society of Philadelphia.

Distribution.—Texas, New Mexico, Oklahoma, Colorado, Kansas, Nebraska, South Dakota, Minnesota, North Dakota, Alberta, and British Columbia. (Fig. 22.)

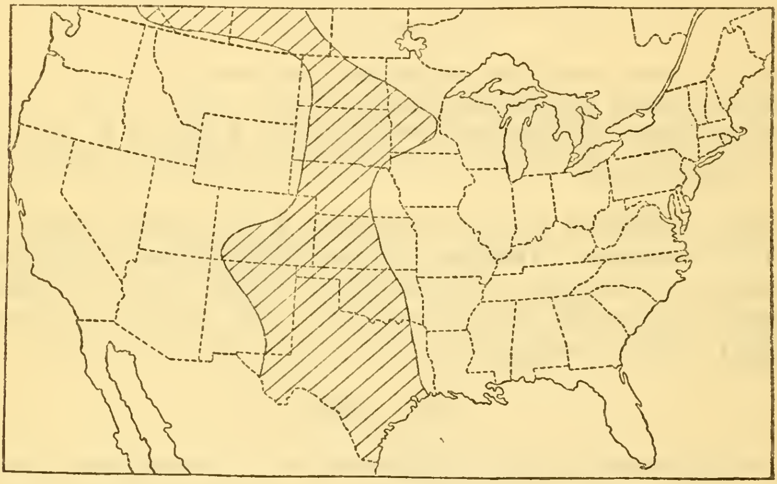

Fig. 22.—Distribution of Dasymutilla caneo (Blake)

SPECIMENS EXAMINED

Alberta, Canada: Female, Medicine Hat, August 23, 1919 (Sladen).

British Columbia, Canada: Female, Oliver, July 24, 1923 (E. R. Buckell).

Colorado: Female, Denver, June 1897 (Wickman); female, Silverton, August (Oslar).

Kansas: Female, Kiowa County, July 6, 1911 (F. X. Williams); female, Lane County (F. X. Williams); 2 females, Morton County, August 5, 1911 (F. X. Williams); 10 females, Grant County, July 23, 1911 (F. X. Williams); female, Stanton County, July 30, 1911 (F. X. Williams); female, Stanton County, August 10, 1911 (F. X. Williams).

Minnesota: Female, Castle Rock, August 20, 1922 (F. C. Fletcher); 2 females, Fridley sand dunes, Anoka County, June 24, 1923 (C. E. Mickel); female, Fridley sand dunes, Anoka County, June 25, 1923 (R. W. Dawson); 4 females, Fridley sand dunes, Anoka County, July 3, 1923 (C. E. Mickel); 3 males, Fridley sand dunes, Anoka County, July 11, 1924 (R. W. Dawson); 3 females, Fridley sand dunes, Anoka County, July 14, 1922 (A. A. Nichol); 9 females, Fridley sand dunes, Anoka County, July 21, 1922 (C. E. Mickel); 4 females, Fridley sand dunes, Anoka County, July 24, 1922 (Paul Gilmer); 20 females, Fridley sand dunes, Anoka County, July 24, 1923 (C. E. Mickel);

4 females, Fridley sand dunes, Anoka County, July 26, 1923 (R. W. Dawson); 6 females, Fridley sand dunes, Anoka County, July 28, 1922 (Paul Gilmer); 4 females, Fridley sand dunes, Anoka County, July 28, 1922 (C. E. Mickel); 19 females, Fridley sand dunes, Anoka County, August 8, 1922 (A. T. Hertig); 12 females, Fridley sand dunes, Anoka County, August 8, 1922 (C. W. Johnson); 5 females, Anoka County, June 30, 1923 (H. H. Knight).

NEBRASKA: Female, Halsey August 13, 1920 (C. B. Philip); female, Halsey, August 14, 1920 (C. B. Philip); female. Halsey, August 16, 1923 (R. W. Dawson); female, Mitchell, August 22, 1915 (E. M. Partridge).

NORTH DAKOTA: Female, Moffitt, August 22, 1922 (O. A. Stevens); 3 females.

OKLAHOMA: Female, Payne County, July 5, 1925 (W. J. Brown).

SOUTH DAKOTA: Female, Buffalo, July 31, 1924.

TEXAS: Female, Richmond, June 22, 1917; female, Fedor, June 11, 1902; female, Lee County, August 7, 1905; female, Twin Sisters, May 25, 1918 (J. C. Bradley); female, Valentine, Presidio County, July 8, 1917; male.

Attention is called to the fact that the postero-lateral tubercles of the head are rather weakly developed and are, therefore, more or less obscure, according to the position of the head. In some specimens a casual observation may give the impression that the posterior margin of the head is evenly rounded but a careful inspection will show the tubercles to be present. The types of *caneo* and *mixtura* have been examined and found to be identical. The specimens vary in length from 5 to 9 mm.

I have examined the type of *M. myrrha* described by Fox in his group *imperialis* (=*Photopsis* Blake pt.), and find it to be identical with this species. The specimen has a rubbed appearance and therefore does not have the characteristic appearance of *caneo*. It is not a *Photopsis* at all and is unquestionably Blake's species *caneo*.

78. DASYMUTILLA BIRKMANI (Melander)

Mutilla birkmani MELANDER, Trans. Amer. Ent. Soc., vol. 29, p. 313, 1903, female.

Type.—Female, Fedor, Lee County, Tex. (G. Birkman), in collection of Museum of Comparative Zoology.

Distribution.—Texas, Oklahoma, Kansas, Nebraska, and Wyoming.

SPECIMENS EXAMINED

KANSAS: Female, Riley County, June 26 (G. A. Dean); female, Riley County, July 17 (Popenoe); 2 females, Riley County, July 19 (G. A. Dean); female, Riley County, July 21 (Popenoe); 4 females, Riley County, July 22 (G. A. Dean); female, Riley County, July 22 (F. Marlatt); 2 females, Riley County, July 25 (G. A. Dean); 2 females, Riley County, August 2 (G. A. Dean); female, Riley County, August 5 (G. A. Dean); female, Riley County, August 7 (Popenoe); 3 females, Riley County, August 9 (J. B. Norton); 2 females, Riley County, August 12 (G. A. Dean); female, Phillips County, August 30, 1912 (F. X. Williams); female, Graham County, August 16, 1912 (F. X. Williams); female, Wallace County (F. H. Snow).

NEBRASKA: Female, Halsey, August 13, 1920 (C. B. Philip); female, Halsey, August 14, 1920 (C. B. Philip); female, Halsey, August 16, 1925 (R. W. Dawson); female, Halsey, September 3, 1924 (R. W. Dawson).

OKLAHOMA: 2 females, Payne County, June 28, 1925 (W. J. Brown); female, Payne County. July 5, 1925 (W. J. Brown); female, Payne County, November 6, 1923 (W. J. Brown).

TEXAS: Female. Richmond, May 29, 1918 (J. C. Bradley); female, Fedor, May 15, 1901 (G. Birkman); female, Fedor, May 22, 1899 (G. Birkman); female, Fedor, June 11, 1899 (G. Birkman); female, Fedor, August 26, 1899; female, Lee County, May 26, 1906; female, Lee County, August 1, 1905; 10 females, Lee County, August, 1905 (G. Birkman); 2 females, Lee County, September 4, 1905; 2 females, Lee County, September 7, 1905; female, Lee County, September 18, 1905; female, Rock Island, August 18, 1922 (Grace O. Wiley); female, Victoria, July 9, 1908 (J. D. Mitchell).

WYOMING: Female, 30 miles north of Lusk, July, 1895.

This species does not belong to Fox's group *imperialis* as indicated by Melander but is a true *Dasymutilla* and is closely related to *caneo* Blake. It is readily distinguished from the latter species by the black appressed pubescence on the dorsum of the thorax. The specimens vary in length from 4.5 to 10 mm. The postero-lateral tubercles of the head are present in this species but more or less obscure.

79. DASYMUTILLA PAENULATA, new species

Female.—Pale ferruginous; head and thorax above densely clothed with appressed, very pale golden pubescence; apical half of second abdominal tergite with a pair of large, round, coalescent, pale yellow spots, the punctures in the latter area large and separated, the punctures anterior and posterior to this area, smaller and continguous; pygidial area longitudinally striate; length, 8.5 mm.

Head ferruginous; front and vertex densely clothed with appressed, pale golden pubescence and long, scattered erect, pale hairs; genae clothed with sparse, silvery pubescence; mandibles acute at the apex, very faintly unidentate within; anterior margin of clypeus slightly sinuate but not noticeably bidentate medially; anterior half of the clypeus glabrous, impunctate, separated from the posterior half by a transverse, sinuate carina; posterior half of clypeus punctate, clothed with long, pale pubescence, the latter forming the clypeal fringe; scape with distinct punctures above, and sparse, silvery pubescence; first segment of flagellum not as long as twice its width at the apex, very much shorter than the length of segments two and three united; antennal scrobes not carinate above; front and vertex coarsely, closely punctate; genae with moderate, almost continguous punctures, not nearly as coarsely sculptured as the front; relative widths of head and thorax, 5.5–5.75.

Thorax pale ferruginous; dorsum and posterior face of propodeum densely clothed with appressed, very pale golden pubescence and scattered, long, pale, erect hairs; dorsum of thorax with very coarse, large, contiguous punctures; the posterior face and dorsum of the propodeum with coarse, contiguous, foveate punctures; scutellar scale broad and distinct; propleura with large, close, indistinct punctures, sparsely clothed with silvery pubescence; anterior half of mesopleura finely punctate, the posterior half coarsely, closely punctate, sparsely clothed with silvery pubescence, the latter somewhat more dense on the posterior half than on the anterior half; metapleura coarsely punctured at the ventral margin, finely, indistinctly punctured elsewhere, moderately clothed with silvery pubescence; sides of propodeum with large, indistinct punctures and clothed with sparse, silvery pubescence.

Abdomen pale ferruginous; first abdominal tergite short, nodose, closely foveate at the apical margin and submargin, clothed with scattered, erect, pale hairs, a thin apical fringe of silvery pubescence, and a conspicuous, median spot of dense, silvery pubescence at the apex; apical half of second abdominal tergite with a pair of large, round, coalescent, pale yellow spots; this area with large, separated punctures and sparse, appressed and erect, pale hairs; basal area of disk anterior to the pale yellow spots with dense, moderate punctures and sparse, black appressed pubescence, together with scattered, erect hairs; apical fringe of second tergite black, except lateral extremes yellow, and submarginal area of the apex of second tergite clothed with sparse, black, appressed pubescence; lateral areas of second tergite with close, large, elongate punctures; third tergite with moderate, distinct punctures, clothed with black pubescence, except extreme lateral margins and broad median area with silvery pubescence; tergites 4 and 5 with small, indistinct punctures, clothed with sparse, silvery pubescence; marginal areas of pygidial segment clothed with silvery pubescence; pygidium longitudinally striate; carina of first sternite feebly bidentate, with scattered, erect, pale hairs; second sternite with large, distinct punctures throughout, except punctures of apical margin close and confluent; clothed with scattered, erect, pale hairs, and a thin apical fringe of silvery pubescence; apical margins of sternites 3–5 closely, confluently punctate, each with a thin apical fringe of silvery pubescence; ultimate sternite punctate at the apex and the same area clothed with black pubescence.

Legs pale ferruginous, very sparsely clothed with silvery pubescence; calcaria and tibial spines dark.

Holotype.—Female, Phoenix, Ariz., August 3, 1917, in collection of Cornell University (No. 764.1).

Paratype.—Female, Phoenix, Ariz., August 3, 1917, in collection of J. Bequaert.

Closely related to *caneo* Blake and *birkmani* Melander. Differs from those species in the dense, very pale golden pubescence of the head and thorax, the maculation and sculpture of the second tergite and the color of the pubescence of the third tergite. The paratype is smaller than the type, its length being 5 mm.

80. DASYMUTILLA BONITA, new species

Female.—Ferruginous, coarsely sculptured throughout, and sparsely clothed with silvery pubescence; second abdominal tergite with very large, contiguous, foveate punctures, and a submedian spot of black pubescence; apical fringes of second and third abdominal tergites pale, interrupted medially by a small spot of black pubescence; length, 7 mm.

Head ferruginous, clothed throughout with sparse, erect and recumbent, silvery pubescence, and a few, scattered, erect, black hairs; mandibles acute at the apex, weakly unidentate within; anterior margin of clypeus not noticeably bidentate medially; anterior half of clypeus glabrous, impunctate, separated from the posterior half by a sinuate carina; the posterior half punctate and sparsely clothed with long, pale pubescence, the latter forming a clypeal fringe; antennae dark ferruginous; scape with moderate, indistinct punctures; first segment of flagellum about twice as long as its own width at the apex, and almost equal beneath to segments three and four united; antennal scrobes not carinate above; front and vertex with large, coarse, more or less confluent punctures; genae with moderate, more or less confluent punctures; relative widths of head and thorax, 5–5.5.

Thorax feruginous, sparsely clothed throughout with silvery pubescence and scattered, erect, pale hairs, except the disk of the pronotal area, and a small area anterior and posterior to the scutellar scale, with sparse, black pubescence; dorsum of thorax and propodeum with coarse, large, contiguous punctures, the punctures larger and deeper on the propodeum than on the dorsum of the thorax; scutellar scale well-developed; propleura with large, indistinct punctures near the margins, very small, indistinct punctures on the disk; anterior half of mesopleura finely punctate, the posterior half with large, confluent punctures, the posterior margin of the latter with dense, silvery pubescence; metapleura with large, confluent punctures near the ventral margin and fine punctures elsewhere, the ventral half of the posterior margin with dense, silvery pubescence; sides of propodeum with very large, close punctures.

Abdomen ferruginous; first tergite short, nodose, the disk glabrous, impunctate, the posterior fourth with large, deep, contiguous punctures; clothed with scattered, erect, pale hairs and a conspicuous, transverse spot of dense silvery pubescence at the apical margin;

second tergite with very large, close, foveate punctures throughout, closer and more or less confluent on the disk; clothed with sparse, erect, pale hairs, a submedian (slightly anterior to median) spot of appressed black pubescence, and an apical fringe of silvery pubescence, interrupted medially by a small spot of black pubescence; tergites 3–5 with small close punctures; tergite 3 clothed with sparse, silvery pubescence, except for a transverse median spot of black pubescence; tergites 4 and 5 with sparse, silvery pubescence; margins of pygidial segment with long, dark hairs; pygidium longitudinally striate; carina of first sternite not dentate; second sternite with large, close punctures, the apical margin, densely, confluently punctate, clothed with scattered, erect, pale hairs, and a thin apical fringe of silvery pubescence; sternites 3–5 densely, confluently punctate near the apical margin, and each with a thin apical fringe of silvery pubescence; ultimate tergite punctate apically and clothed with sparse, erect, silvery pubescence.

Legs ferruginous, sparsely clothed with silvery pubescence; calcaria and tibial spines dark.

Holotype.—Female, Bonita, Graham County, Ariz., July 12, 1917 (J. Bequaert), in collection of University of Minnesota.

Paratype.—Female, Bonita, Graham County, Ariz., July 12, 1917 (J. Bequaert), in collection of J. Bequaert.

Related to *caneo*, *birkmani*, and *paenulata* but quite distinct from them by the much longer first segment of the flagellum, pubescent maculation of the first tergite, and the submedian black pubescent spot of the second tergite.

81. DASYMUTILLA EURYNOME, new species

Female.—Head and thorax dark ferruginous sparsely clothed with appressed, silvery pubescence and scattered, erect, dark hairs; abdomen ferruginous; first tergite broadly margined at the apex with silvery pubescence; second tergite with a submedian spot of black pubescence and small contiguous punctures; apical silvery fringe of second tergite interrupted medially by a spot of black pubescence; length, 7 mm.

Head dark ferruginous, sparsely clothed throughout with appressed, silvery pubescence and scattered, erect, dark hairs; mandibles acute at the apex, feebly unidentate within; anterior margin of clypeus very feebly bidentate medially; anterior half of clypeus glabrous, impunctate, separated from the posterior half by a sinuate carina; posterior half densely punctate and pubescent, the pubescence forming the clypeal fringe; scape indistinctly punctate, sparsely clothed with silvery pubescence; first segment of flagellum about twice as long as its own width at the apex, approximately equal in length beneath to segments 3 and 4 united; antennal scrobes not carinate above; front, vertex and genae with coarse, deep, confluent punctures; relative widths of head and thorax, 4.75–5.

Thorax dark ferruginous, clothed throughout with sparse, appressed, silvery pubescence, and scattered, erect, dark hairs, the silvery pubescence somewhat more dense on the propodeum, at the posterior margin of the propleura, the anterior half of the mesopleura, and the ventral half of the metapleura; dorsum of thorax, and posterior face of propodeum deeply, contiguously, foveately punctate; scutellar scale present, a very small area of black pubescence adjacent to the latter; propleura coarsely punctate throughout; anterior half of mesopleura finely punctate, the posterior half coarsely, confluently punctate; metapleaura coarsely punctate near the ventral margin, elsewhere finely punctate; sides of propodeum with large, somewhat shallow, contiguous, foveate punctures.

Abdomen ferruginous; first tergite short and nodose, coarsely punctate, especially so at the apical and lateral margins, clothed with scattered, erect, pale hairs, the apical margin with a broad band of dense, appressed, silvery pubescence; second tergite for the most part with large, separated, foveate punctures, clothed with scattered, erect, dark and pale hairs, except a large submedian spot (anterior to median) with small, contiguous punctures, and sparse, appressed, black pubescence, the spot margined with silvery pubescence; apical fringe of second tergite interrupted medially with a spot of black pubescence; tergites 3–5 with indistinct, moderate punctures, all sparsely clothed with appressed, silvery pubescence, and scattered, long, dark, erect hairs, the third tergite with a faint spot of black pubescence medially; margins of pygidial segment clothed with dark hairs; pygidium longitudinally striate; carina of first sternite not dentate, the latter with scattered, erect, pale hairs; second sternite with large, close, distinct punctures, the punctures confluent along the apical margin, clothed with scattered, erect, pale hairs, and a thin apical fringe of silvery pubescence; sternites 3–5 closely, moderately punctate near the apical margins and each with a thin apical fringe of silvery pubescence; ultimate sternite punctate and with erect, dark hairs.

Legs ferruginous, sparsely clothed with silvery pubescence; calcaria ferruginous like the legs; tibial spines dark.

Holotype.—Female, Valentine, Presidio County, Tex., July 8, 1917 (J. Bequaert), in collection of University of Minnesota.

Paratype.—Female, Valentine, Presidio County, Tex., July 8, 1917 (J. Bequaert), in collection of J. Bequaert.

Related and very similar in appearance to *bonita.* It differs from the latter by the darker head and thorax, the absence of any definite area of black pubescence on the dorsum of the thorax, less coarse puncturation of the second tergite and the submedian spot of second tergite with small contiguous punctures.

82. DASYMUTILLA SAETIGERA, new species

Female.—Ferruginous, the head and thorax slightly darker than the abdomen; head and thorax sparsely clothed above with appressed silvery pubescence, and scattered, erect, conspicuous black hairs, except the vertex and mesonotal area with the pubescence entirely black; second abdominal tergite with separated, foveate punctures, a median basal spot of black pubescence, and a basal and apical pair of indistinct pale ferruginous spots; length, 9.5 mm.

Head dark ferruginous; scape, antennal scrobes, front and genae with sparse, somewhat appressed silvery pubescence; front also with conspicuous, erect, sparse, black hairs; the vertex with the vestiture entirely black; mandibles acute at the apex, feebly unidentate within; anterior margin of clypeus feebly bidentate medially; anterior half of clypeus glabrous, impunctate, separated from the posterior half by a sinuate carina; posterior half of clypeus densely punctate and with long pubescence, the latter forming the clypeal fringe; scape closely punctate; first segment of flagellum about twice as long as its own width at the apex, approximately equal in length beneath to segments 3 and 4 united; antennal scrobes not carinate above; front, vertex and genae coarsely, deeply, confluently punctate; posterior margin of the genae with a faint indication of a carina; relative widths of head and thorax, 6.75–6.75.

Thorax ferruginous; a longitudinal spot of sparse, black pubescence on the disk of the mesonotum and extending caudally to the scutellar scale; remainder of dorsum with sparse, somewhat appressed, silvery pubescence, denser on the propodeum, and with conspicuous, scattered, erect, black hairs; dorsum very coarsely sculptured with large, deep, confluent fovea; scutellar scale broad, conspicuous; propleura with large, close punctures and a small area of fine punctures medially, sparsely clothed with appressed, silvery pubescence; anterior half of mesopleura finely punctured and with sparse, appressed, silvery pubescence, the posterior half with large, contiguous punctures and sparse, erect, silvery pubescence; metapleura with a few coarse punctures at the ventral margin, finely punctate elsewhere and with appressed, silvery pubescence; sides of propodeum with large foveate punctures.

Abdomen ferruginous; first tergite with indistinct, large punctures on the disk, close, coarse punctures at the apical margin, clothed with sparse, long, erect, pale hairs, a broad apical band of dense, silvery pubescence, and a submarginal row of sparse, long, erect, bristle-like hairs; second tergite with a pair of basal and a pair of apical, indistinct, paler ferruginous spots, the basal smaller than the apical;

punctures large, separated and foveate throughout, each bearing an erect, coarse, dark hair; a median basal spot of appressed black pubescence, margined each side with appressed silvery pubescence; margin of the tergite with the punctures close, almost confluent; apical fringe silvery, broadly interrupted medially with black; third and fourth tergites with close, moderate punctures, each clothed with appressed silvery pubescence, scattered, erect, dark hairs, and a median spot of black pubescence; fifth tergite with close, moderate punctures, appressed, silvery pubescence, and scattered, erect, dark hairs; margins of pygidial segment clothed with dark pubescence; pygidium distinctly longitudinally striate; carina of first sternite not prominent nor dentate, the sternite with large, close punctures and sparse, long, erect, pale hairs; second tergite with large, almost contiguous punctures throughout, the apical margin confluently punctate, sparsely clothed with erect, pale hairs and a thin apical fringe of silvery pubescence; sternites 3–5 moderately, confluently punctate, the apical fringes of 3 and 4 of thin silvery pubescence, that of the fifth of dark pubescence.

Legs ferruginous, sparsely clothed with silvery pubescence; calcaria and tibial spines dark.

Holotype.—Female, Baboquivaria Mountains, Ariz. (F. H. Snow), in collection of University of Kansas.

Related and similar in appearance to *eurynome* and *bonita.* May be easily separated from the two latter by the coarse puncturation of the genae, the black pubescence of the vertex and thoracic notum, the basal spot of black pubescence on the second tergite, the indistinct maculation of the latter, and the row of submarginal bristle-like hairs of the first tergite.

GROUP MONTICOLA

Males black, the second abdominal segment more or less ferruginous; small, not over 10 mm.; apical abdominal tergites inconspicuously clothed with silvery gray pubescence; anterior margin of pronotum more or less emarginate medially, the cephalic face of the emargination glabrous; second abdominal sternite either with or without a median pit densely filled with hairs. Females unknown, probably included in the preceding group.

83. DASYMUTILLA CANELLA (Blake)

Mutilla (*Sphaerophthalma*) *canella* Blake, Trans. Amer. Ent. Soc., vol. 3, p. 239, 1871, male.

Mutilla canella Blake, Trans. Amer. Ent. Soc., vol. 7, p. 244, 1879, male.—Dalle Torre, Cat. Hymen., vol. 8, p. 20, 1897, male.—Fox, Trans. Amer. Ent. Soc., vol. 25, p. 246, 1899, male.—Melander, Trans. Amer. Ent. Soc., vol. 29, p. 298, 1903, male (not female).

Sphaerophthalma canella Blake, Trans. Amer. Ent. Soc., vol. 13, p. 230, 1886, male.
Ephuta (*Ephuta*) *canella* André, Gen. Ins., vol. 1, fasc. 11. p. 58, 1903, male.
Dasymutilla (*Dasymutilla*) *canella* Bradley, Trans. Amer. Ent. Soc., vol. 42, p. 326, 1916, male.—Rohwer, Bull, 22, Conn. Geol. Nat. Hist. Surv., p. 624, 1916, male.

Type.—Male, Texas, in collection of American Entomological Society of Philadelphia.

Distribution.—Connecticut, New York, New Jersey, Pennsylvania, Michigan, Minnesota, Nebraska, South Dakota, and North Dakota.

SPECIMENS EXAMINED

Michigan: 2 males, Ann Arbor, July 16, 1923 (E. G. Anderson).
Minnesota: Male, Fridley sand dunes, Anoka County, May 28, 1925 (C. B. Philip); male, Fridley sand dunes, Anoka County, July 26, 1923 (R. W. Dawson); male, Fridley sand dunes, Anoka County, July 28, 1923 (R. W. Dawson); male, Fridley sand dunes, Anoka County, August 2, 1923.
Nebraska: Male, West Point, June, 1887; male, Sowbelly Canyon, Sioux County, June 23, 1911 (R. W. Dawson).
New Jersey: 6 males, North Woodbury, June 22, 1901; male, North Woodbury, August 1, 1901; male, Big Timber Creek, September 22, 1901; male, Westville, August 30; male, Camden County, July 27, 1890; female, Camden County, 2 males.
New York: 2 males, Cold Springs Harbor, L. I., June 18, 1921 (E. G. Anderson); male, Cold Springs Harbor, L. I., June 22, 1921 (S. H. Emerson); male, Cold Springs Harbor, L. I., July 8, 1921 (E. G. Anderson).
North Dakota: Male, Fargo, July 5, 1923 (W. Baker); male, northeast North Dakota (C. N. Ainslie); male, Trail County, July 19, 1923 (A. A. Nichol); 6 males, Beach, August 22, 1921 (C. N. Ainslie).
Pennsylvania: 2 males, Philadelphia, July, 1912.
South Dakota: Male, Elk Point, June 12, 1925 (H. C. Severin); 2 males.

This species is related to *monticola* Cresson. It may be distinguished from the latter by the apical segments of the abdomen being black, the pubescence of the head and thorax entirely black, and the exceedingly coarse and deep sculpture of the propodeum. The latter character distinguishes it at once from most other male Dasymutillids. The abdomen usually is obscurely grayish pubescent above at the tip. The sculpture of the first and second abdominal tergites varies considerably in intensity. In a few specimens the sculpture of the first tergite is almost as coarse as that of the propodeum, but in most specimens it is distinctly less coarsely sculptured than the propodeum. The second tergite is usually distinctly and somewhat closely punctured, but in a few eastern specimens the puncturation is sparse and small. I have examined Blake's type and find the specimens listed above to agree with it. I have seen no other specimens from Texas, however, other than the type. The genitalia are the same in appearance as those of *monticola* and are therefore not figured. Melander (1903) indicated that *rugulosa* was the female of this species, but the evidence for this was not given and the two are still regarded as separate species. By the process of elimination I have arrived at the same conclusion and think that Melander was probably correct.

84. DASYMUTILLA MONTICOLA (Cresson)

Plate 3, fig. 21

Mutilla monticola Cresson, Proc. Ent. Soc. Phila., vol 4, p. 430, 1865, male.—Blake, Trans. Amer. Ent. Soc., vol. 7, p. 244, 1879, male.—Dalle Torre, Cat. Hymen., vol. 8, p. 64, 1897, male.—Fox, Trans. Amer. Ent. Soc., vol. 25, p. 246, 1899, male.

Mutilla (Sphaerophthalma) monticola Blake, Trans Amer. Ent. Soc., vol. 3, p. 237, 1871, male.

Mutilla eximia Blake, Trans. Amer. Ent. Soc., vol. 13, p. 200, 1886, male.—Dalle Torre, Cat. Hymen., vol. 8, p. 39, 1897, male.—Fox, Trans. Amer. Ent. Soc., vol. 25, p. 246. 1899, male.

Sphaerophthalma monticola Blake, Trans. Amer. Ent. Soc., vol. 13, p. 226, 1886, male.

Ephuta (Ephuta) eximia André, Gen. Ins., vol. 1, fasc. 11, p. 59, 1903, male.

Ephuta (Ephuta) monticola André, Gen. Ins., vol. 1, fasc. 11, p. 62, 1903, male.

Ephuta boulderensis Rohwer, Trans. Amer. Ent. Soc., vol. 35, p. 133, 1909, male.

Pycnomutilla boulderensis Rohwer, Proc. U. S. Nat. Mus., vol. 41, p. 455, 1912, male.

Type.—Male, Colorado Territory, in collection of American Entomological Society of Philadelphia. The type of *eximia* is in the collection of the American Entomological Society of Philadelphia; that of *boulderensis* is in the United States National Museum.

Plesiotype.—Male, Ogallala, Nebr., June 24, 1913 (R. W. Dawson), in collection of University of Nebraska.

Distribution.—Minnesota, North Dakota, Alberta, British Columbia, Nebraska, Kansas, Colorado, and Arizona.

SPECIMENS EXAMINED

Alberta, Canada: Female, Lethbridge, June 28, 1914 (F. W. L. Sladen); 2 males, Lethbridge, July 28, 1916 (Sladen).

British Columbia, Canada: Male, Oliver, July 17, 1923 (E. R. Buckell).

Colorado: Male, Fort Collins, June 18, 1900; male, Fort Collins, June 22, 1898; 3 males, Fort Collins, June 26, 1901; male, Fort Collins, June 28, 1904; male, Denver, October 1, 1906 (Oslar).

Kansas: Male, Belvidere, June (W. Knaus); 2 males, Meade County, July 10, 1911 (F. X. Williams); 2 males, Grant County, July 23, 1911 (F. X. Williams); male, Morton County, June (F. H. Snow); male, Morton County, (F. H. Snow); 2 males, Stanton County, July 30, 1911 (F. X. Williams); male, Hamilton County, June, 1902 (F. H. Snow); male, Wichita County (F. X. Williams); male, Wallace County, July, 1885; male, Wallace County (F. H. Snow).

MINNESOTA: Male, Fridley sand dunes, Anoka County, July 11, 1924 (R. W. Dawson).
NEBRASKA: 6 males, Ogallala, June 24, 1913 (R. W. Dawson); male, Sioux County, July.
NORTH DAKOTA: 2 males, Medora, August 3, 1923 (O. A. Stevens).

I have examined the types of *eximia* Blake and *boulderensis* Rohwer and find them to be the same as this species. This species is easily recognizable by the ferruginous abdomen and grayish pubescence of the head, thorax, and apical abdominal segments. The specimens from Minnesota and North Dakota have the ferruginous color of the propodeum and first abdominal segment much reduced so that both are almost entirely black. The specimens vary in size from 5.5 to 9 mm. This may be the male of *caneo* (Blake).

85. DASYMUTILLA MACILENTA (Blake)

Plate 3, fig. 17

Mutilla (*Sphaerophthalma*) *macilenta* BLAKE, Trans. Amer. Ent. Soc., vol. 3. p. 239, 1871, male.
Mutilla macilenta BLAKE, Trans. Amer. Ent. Soc., vol. 7, p. 244, 1879, Male.—DALLE TORRE, Cat. Hymen., vol. 8, p. 56, 1897, male.—FOX, Ent. News, vol. 11, p. 401, 1900, male.
Sphaerophthalma macilenta BLAKE, Trans. Amer. Ent. Soc., vol. 13, p. 231, 1886, male.
Ephuta (*Ephuta*) *macilenta* ANDRÉ, Gen. Ins., vol. 1, fasc. 11, p. 61, 1903. male.

Type.—Male, Texas, in collection of Entomological Society of Philadelphia.

Plesiotype.—Male, Spring Creek, Decatur County, Georgia, in collection of Cornell University.

Distribution.—Texas?, Florida, Georgia, Alabama.

SPECIMENS EXAMINED

ALABAMA: Male.
FLORIDA: Male, Alachua County, April 29, 1923 (Alexander Walker).
GEORGIA: 2 males, Spring Creek, Decatur County, July 16–29, 1912.

The above specimens have been compared with the type and found to be identical. This species is closely related to *monticola* and *canella*. *Monticola* is distinguished by having the abdomen entirely ferruginous, while *macilenta* has the apical segments black. It differs from *canella* in having the propodeum much less coarsely sculptured. All three species have the pit on the second abdominal sternite. It is questionable whether the locality label on the type is correct.

86. DASYMUTILLA POLIA, new species

Male.—Head and thorax black, clothed with silvery gray pubescence, except the mesonotum clothed with dark, almost black pubescence; abdomen ferruginous, the apical segments black, the disk of the second tergite pale yellow; apical fringes of tergites 5–6, and sternites 2–4 gray; second sternite with a small, median pit densely filled with hairs; legs dark ferruginous, clothed with pale hairs. Length, 9 mm.

Head black, sparsely clothed with erect and appressed grayish pubescence; mandibles acute at the apex, bidentate within near the apex; clypeus bidentate medially on the apical margin, the disk densely, confluently punctate; base of mandibles and clypeus sparsely clothed with grayish pubescence; scape bicarinate beneath, closely punctate above; first segment of flagellum about two-thirds the length of the second; antennal scrobes inconspicuously carinate above; front coarsely confluently punctate; vertex with large, shallow, sparse punctures, not nearly as coarsely sculptured as the front; genae with moderate, shallow punctures; relative widths of head and thorax, 5–5.5.

Thorax black, clothed with sparse, erect and appressed, silvery gray pubescence, except that on the mesonotum very dark ferruginous, almost black; the pubescence on the pro- and mesonotum more dense than on other parts of the thorax; anterior face of pronotum emarginate medially, the face of the emargination glabrous, impunctate, remainder of anterior face of pronotum punctate and pubescent; pronotum, mesonotum, and scutellum with large, close punctures throughout, denser on the mesonotum and scutellum than on the pronotum; the propleura strongly and closely punctured anteriorly, with sparse large punctures and fine punctures intermixed posteriorly; mesopleura with sparse, large, shallow punctures, the latter more dense medially than at the margins; metapleura glabrous, impunctate except for a few large punctures ventrally; sides and posterior face of propodeum coarsely, foveately reticulate throughout, the fovea rather deep; tegulae glabrous, impunctate except for a few setigerous punctures at the basal and inner lateral margins.

Abdominal segments 1–5 ferruginous, the disk of the second tergite pale yellow; apical abdominal segment blackish; tergites 1–2 with sparse, erect, grayish pubescence; tergites 2–4 and sternites 5–6 with an apical fringe of black hairs; tergites 5–6 and sternites 2–4 with apical fringes of silvery gray hairs; first tergite coarsely, confluently punctate throughout; second tergite with contiguous, large, deep, and elongate punctures, except those near the apical margin smaller and shallow; tergites 3–6 with small close punctures; pygidial area somewhat longitudinally rugose, without an apical fringe of hairs; first sternite punctate and with a median longitudinal carina, the latter not more prominent anteriorly than posteriorly; punctures of second sternite large, deep, elongate, and close, except medially and basally the punctures are small; second sternite with a small, basal median pit, densely filled with hairs; sternites 3–6 with fine scattered punctures near their apical margins; ultimate sternite glabrous, impunctate on apical third, densely punctate elsewhere.

Legs dark ferruginous, sparsely clothed with pale pubescence; calcaria dark ferruginous.

Wings dark fuliginous; cell 2nd R_1+R_2 squarely truncate at the apex; cell R_4 indistinct; vein M_{3+4} received by cell R_5 at one-fourth the distance from the base to the apex; veins r–m and R_5 widely separated on vein r.

Holotype.—Male, Nogales, Arizona, July 20, 1903 (Oslar), in collection of Cornell University (758.1).

Paratype.—Male, Nogales, Arizona, July 20, 1903 (Oslar), in collection of University of Minnesota.

This species is related to *monticola*, *canella*, and *macilenta*. It closely resembles *monticola* but the apical abdominal segments are blackish, the mesonotum is clothed with very dark pubescence, the tegulae are glabrous and impunctate for the most part, and the disk of the second tergite is yellow. The characters given in the key will separate the two. The genitalia are very similar to those of *monticola* and are therefore not figured.

87. DASYMUTILLA ARCANA, new species

Male.—Black, the second segment of the abdomen entirely ferruginous; apical segments of abdomen above clothed with sparse, grayish pubescence, the remainder of the body entirely with black pubescence; second sternite simple, without a median pit or other modification; length, 8 mm.

Head black, sparsely clothed with long, erect, black pubescence; mandibles acute at the apex, bidentate subapically within; anterior margin of clypeus distinctly bidentate medially; clypeus densely punctate; scape with a single longitudinal carina beneath, closely punctured and clothed with coarse, erect, black hairs; first segment of flagellum slightly shorter than the second (measured dorsally); antennal scrobes not carinate above; front and vertex with large, contiguous punctures; genae with small, contiguous punctures; occiput excavated laterally each side at the posterior margin; relative widths of head and thorax, 5–5.5.

Thorax black, sparsely clothed with long, erect, black pubescence; cephalic face of pronotum punctured laterally, glabrous, impunctate, and distinctly emarginated medially, not rounded evenly into the dorsum; dorsum of pronotum, mesonotum, and scutellum with large, dense, more or less confluent punctures; tegulae with scattered setigerous punctures throughout; propleura with large, contiguous punctures anteriorly, finely punctured posteriorly; mesopleura with large, scattered, indistinct punctures interspersed with fine punctures anteriorly, with large contiguous, somewhat confluent punctures posteriorly; metapleura glabrous, with scattered, indistinct very fine punctures, and a few large punctures ventrally; sides of propodeum glabrous, impunctate anteriorly, becoming shallowly, foveately punctate posteriorly; posterior face and dorsum of propodeum shallowly, foveately reticulate.

Abdomen black, the first two segments ferruginous, the second tergite with a large yellow area covering the disk; abdomen clothed with sparse, long, erect, black pubescence, except the apical two or three tergites clothed with grayish pubescence; first segment strongly nodose; first tergite coarsely, confluently punctate; second tergite with large, distinct contiguous punctures at the base, sides and apex, but with distinct separated punctures on the disk; tergites 3–6 densely punctate; pygidial area glabrous, indistinctly longitudinally rugose, and with a thin, indistinct apical fringe of short, erect hairs; carina of first sternite prominent, but not dentate, the sternite coarsely, confluently punctate; second sternite with large, distinct, close punctures, without a median pit filled with hairs; apical margins of sternites 3–6 with scattered, small punctures; ultimate sternite punctate and pubescent.

Legs dark mahogany red, almost black, clothed with long, sparse, black pubescence; calcaria dark.

Wings dark fuliginous; cell 2nd R_1+R_2 broadly truncate at the apex; cell R_4 almost obsolete; vein M_{3+4} received by cell R_5 at one-third the distance from the base to the apex; veins r-m and R_5 separated on vein r.

Holotype.—Male, Lee County, Tex., June 8, 1906, in collection of University of Kansas.

Distribution.—Texas, Oklahoma and New Mexico.

Paratypes.—Male, Lee County, Texas, May 19, 1906; male, Lee County, Texas, May 19; male, Lee County, Texas, May 24, 1906; male, Lee County, Texas, May; male, Lee County, Texas, August; male, Fedor, Texas; 2 males, Richmond, Texas, May 29, 1918 (J. C. Bradley); male, Richmond, Fort Bend County, June 22, 1917; male, Victoria, Texas, May 25, 1908 (J. D. Mitchell); male, Victoria, Texas, August 3, 1916 (J. D. Mitchell); male, New Braunfels, Texas, May 23–26, 1918 (J. C. Bradley); male, Durant, Oklahoma, June 2, 1905 (F. C. Bishopp); male, Las Cruces, New Mexico (Townsend), in collections of University of Kansas, United States National Museum, University of Minnesota, Cornell University, and the author.

Very similar in appearance to *canella* and has been confused with that species in collections. Differs from *canella* in lacking the median pit on the second abdominal sternite, and in the propodeum being shallowly reticulate; in *canella* the propodeum is very deeply and coarsely reticulate. It is also similar to *reclusa* but differs from that species in having the second abdominal segment entirely ferruginous and the disk of the second tergite with separated punctures. The first abdominal segment is always more or less reddish but in most of the paratypes is considerably darker than the second. The length varies from 6–9 mm. The genitalia are similar to *monticola* and are therefore not figured.

88. DASYMUTILLA RECLUSA, new species

Plate 3, fig. 22

Male.—Black, the second abdominal tergite yellowish-ferruginous with the basal, lateral, and apical margins black; clothed with sparse, erect, black pubescence, except the apical tergites with sparse, inconspicuous, grayish pubescence; second sternite simple, without a median pit or other modification; length, 6.5 mm.

Head entirely black, sparsely clothed with long, erect, black pubescense; mandibles acute at the tips, bidentate subapically within; anterior margin of clypeus weakly bidentate medially; clypeus densely punctate; scape with a single distinct longitudinal carina, and a second weak, indistinct carina, closely punctate, and clothed with coarse, erect, black hairs; first segment of flagellum distinctly shorter than the second measured dorsally, slightly shorter measured ventrally; antennal scrobes not carinate above; front, vertex and genae with moderate, close, more or less confluent punctures; posterior margin of head somewhat excavated laterally; relative widths of head and thorax, 4.5–4.75.

Thorax entirely black, sparsely clothed with long, erect, black pubescence; cephalic margin of pronotum punctate laterally, glabrous, impunctate and distinctly emarginate medially, not rounded evenly into the dorsum; dorsum of pronotum, mesonotum and scutellum densely, somewhat confluently punctate; tegulae with scattered setigerous punctures throughout; cephalic margin of propleura very feebly defined by a carina; propleura anteriorly with large, close punctures, posteriorly with fine punctures; mesopleura with scattered, large punctures interspersed with fine punctures anteriorly, and with large, somewhat confluent punctures posteriorly; metapleura glabrous, impunctate, except for large punctures ventrally; sides of propodeum shallowly, indistinctly sculptured anteriorly, becoming confluently, foveately punctate posteriorly.

Abdomen black, the second tergite, except the basal, lateral, and apical margins, yellowish; clothed throughout with sparse, erect, black pubescence, except the apical tergites with sparse, grayish pubescence and the second tergite with obscure yellowish pubescence on the yellow area; first segment nodose; the first tergite coarsely, somewhat confluently punctate; the second tergite with large, distinct, contiguous punctures throughout; tergites 3–6 densely punctate, the punctures becoming smaller on each successive tergite, those on the sixth fine; pygidial area glabrous, indistinctly sculptured, with an inconspicuous, thin, apical fringe of short, erect hairs; carina of first sternite prominent, but not dentate, the sternite coarsely, confluently punctured; second sternite with large, distinct, contiguous punctures throughout, without a median pit filled with hairs; sternites 3–6, with small, scattered punctures near the apical margin; ultimate tergite punctate and pubescent.

Legs black, clothed with long, sparse, black pubescence; calcaria black.

Wings dark fuliginous; cell 2nd R_1+R_2 broadly truncate at the apex; cell R_4 almost obsolete; vein M_{3+4} received by cell R_5 at one-third the distance between the base and the apex; veins r–m and R_5 approximate on vein r.

Holotype.—Male, Halsey, Nebr., August 29, 1924 (R. W. Dawson); in collection of University of Minnesota.

Distribution.—Montana, Wyoming, South Dakota, Nebraska, Kansas, Oklahoma, and Texas.

Paratypes.—Male, West Point, Nebr., June 21 (P. R. Jones); male, West Point, Nebr., June 22, 1905 (H. S. Smith); male, Ogallala, Nebr., June 24, 1913 (R. W. Dawson); male, Bridgeport, Nebr., July 11, 1917 (C. E. Mickel); 5 males, 40 miles north of Lusk, Wyo., July, 1895; male, Billings, Mont., July 18, 1904; 2 males, Riley County, Kans., June 26 (G. A. Dean); male, Riley County, August 7 (Popenoe); male, Nickerson, July 5, 1914; male, Belvidere, June (W. Knaus); 4 males, Clark County, June (F. H. Snow); male Finney County, June, 1895 (H. W. Menke); male, Morton County (F. H. Snow); male, Hamilton County, June, 1902 (F. H. Snow); male, Payne County, Okla., June 3, 1925 (W. J. Brown); male, Hot Springs, S. Dak., July 8, 1924; female, Richmond, Tex., June 22, 1917; male, Lee County, Tex., August 3, 1905; in collections of University of Minnesota, University of Nebraska, University of Kansas, Kansas State Agricultural College, Montana State Agricultural College, Cornell University, South Dakota State Agricultural College, W. Knaus, and the author.

This species is similar to *canella* but differs from the latter by the absence of the median pit on the second abdominal sternite and by the less coarse sculpture of the propodeum. It resembles *arcana* but may be distinguished from that species by the second abdominal segment not being entirely ferruginous and the denser punctuation of the second tergite. The paratypes vary in length from 6–9 mm.

GROUP OCCIDENTALIS

Females with the head narrower than the thorax except in *gorgon*, *leda*, *aureola*, and *aureola* var. *pacifica*); antennal scrobes carinate above (except in *gorgon* and *leda*); thorax distinctly longer than broad, subrectangular; scutellar scale well developed, usually with a sinuate, discontinuous carina immediately anterior; pygidium either longitudinally striate or rugose; bodies coarsely sculptured and clothed with dense, erect pubescence. Large, 10–25 mm.

Males black, the abdomen above clothed with dense, erect white, yellow, or red pubescence; head narrower than the thorax (except in *aureola* and *aureola* var. *pacifica*); second abdominal sternite with a median pit densely filled with hairs; apical margin of last tergite with or without a fringe of short, erect hairs.

89. DASYMUTILLA OCCIDENTALIS (Linnaeus)

Plate 3, fig. 23

Mutilla occidentalis LINNAEUS, Syst. nat., ed. 10, vol. 1, p. 582, 1758, female.—SULZER, Kennz, d. Insect, p. 53, pl. 19, fig. 126*g*, 1761; Syst. nat., ed. 12, vol. 1, p. 966, 1767.—FABRICIUS, Syst, entom., p. 396, 1775.—Ph. L. MULLER, Linnaeus; Vollst. Natursyst., vol. 5, pt. 2, p. 918, pl. 27, fig 18, 1775.—FABRICIUS, Spec. Insect., vol. 1. p. 494, 1781; Mart. Insect., vol. 1, p. 311, 1787.—GMELIN, Linnaeus: Syst. nat., ed. 13, vol. 1, pt. 5, p. 2805, 1790.—CHRIST, Naturg. d. Insect., p. 148, pl. 12, fig. 3, 1791.—LEPELETIER, Hist. nat. Insect. Hymen., vol. 3, p. 596, pl. 36, fig. 8 (male), 1845, female, male.—MENDENHALL, Amer. Natural., vol. 17, pp. 323–324, 1883.—DALLE TORRE, Cat. Hymen., vol. 8, pp. 67–68, 1897.—FOX, Trans. Amer. Ent. Soc., vol. 25, p. 237, 1899.—MELANDER, Trans. Amer. Ent. Soc., vol. 29, p. 296, pl. 4, fig. 9, 1903.

Mutilla bifasciata SWEDERUS, Svensk. Vet. Akad. Handl., vol. 8, p. 285, 1787, male.—GMELIN, Linnaeus: Syst. nat., ed. 13, vol. 1, pt. 5, p. 2808, 1790.—DALLE TORRE, Cat. Hymen., vol. 8, p. 16, 1897.

Mutilla coccinea FABRICIUS, Entom. system, vol. 2, p. 366, 1793; Syst. Piez., p. 429, 1804.—JURINE, Nouv. meth. class. Hymen., p. 267, 1807, female.—KLUG. Magaz. Ges. naturf. Fr. Berlin, p. 62, 1808, female.—OLIVIER, Encycl. method. Insect., vol. 8, p. 55, 1811.—LEACH, Zool. Miscell, vol. 2, p. 111, 1815, female, male, pl. 100.—SERVILLE and PALISOT de BEAUVAIS, Insect. Afr. & Amer., p. 257, Hymen., 1821, male, pl. 10, fig. 1 male, and 2 female.—LUCAS, Guerin: Dict. pittor, d'hist. natur. Paris, vol. 9, p. 535, 1837, female, male; Atl., pl. 395, fig. 2.—DUMÉRIL, Mém. acad. sc. Paris, vol. 31, p. 903, 1860, fig.

Mutilla (*Sphaerophthalma*) *occidentalis* BLAKE, Trans. Amer. Ent. Soc., vol. 3, p. 236, 1871, female, male; Trans. Amer. Ent. Soc., vol. 4, p. 73, 1872, female, male.

Sphaerophthalma occidentalis RADOSZKOWSKI, Horae soc. entom. Ross., vol. 19, p. 32, pl. 6, fig. 46, 1885.—BLAKE, Trans. Amer. Ent. Soc., vol. 13, p. 223, 1886, female, male.

Ephuta (*Ephuta*) *occidentalis* André, Gen. Ins., vol. 1, fasc. 11, p. 62, 1903, female.

Dasymutilla (*Dasymutilla*) *occidentalis* Bradley, Trans. Amer. Ent. Soc., vol. 42, p. 322, 1916, female, male.

Dasymutilla (*Dasymutilla*) *comanche* Bradley, Trans. Amer. Ent. Soc., vol. 42, p. 322, 1916, female, male.

Dasymutilla occidentalis Banks, Ann. Ent. Soc. Amer., vol. 14, p. 25, 1921.—Rau, Trans. Acad. Sci. St. Louis, vol. 24, p. 7, 1922.

Dasymutilla comanche Banks, Ann. Ent. Soc. Amer., vol. 14, p. 25, 1921.

Plesiotype.—Male, Lucaston, New Jersey, September 2, 1901, entomological collection of University of Minnesota.

Distribution.—New York, New Jersey, Connecticut, Maryland, District of Columbia, West Virginia, Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Tennessee, Kentucky, Indiana, Illinois, Missouri, Arkansas, Louisiana, eastern Texas. (Fig. 23.)

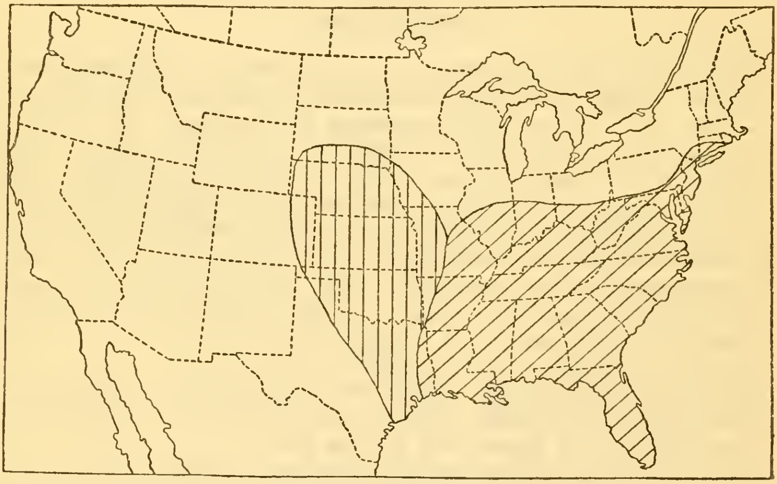

Fig. 23. Distribution of Dasymutilla occidentalis (L.) ▨
" " Dasymutilla occidentalis var. comanche ▥

SPECIMENS EXAMINED

Alabama: Female, Cowarts, August 1–3, 1916; female, Auburn; 2 females.

Arkansas: Female, Desarc, October 10, 1910; male, (P. H. Rolfs).

Connecticut: Female.

District of Columbia: Female, Washington, August 1, 1917 (F. C. Pratt); female, Washington, August 29, 1893; female, Washington (W. R. Maxon).

Florida: 2 females, male, Miami (H. C. Henriksen); female, Miami, March 4; 4 males, Everglade, April 15, 1912 (W. T. Davis); 2 males, Everglade, April 15, 1912; 3 females, 6 males, Everglade, May, 1912; female, male, Everglade, June, 1912; male, Everglade, July, 1912; 3 females, Chokeloskee, May, 1903; female, Marco, April 18, 1912; male, Marco, April 21, 1912; male, LaBelle, April 27, 1912 (W. T. Davis); female, LaBelle, April 28, 1912; 4 males, LaBelle, May 8–10, 1916 (J. C. Bradley); female, Estero (Van Duzee); female, 2 males, Osprey (C. W. Webb); female, Vero, September 4, 1908; 5 females, male, Indian River; male, Orlando, May 30, 1925 (O. C. McBride); male, Sanford, May 4, 1905 (Van Duzee); female, Eustis, July 19 (H. G. Hubbard); male, Lake county, April 30, 1922 (T. P. Winter); female, Ocala, October 24, 1919; female, Gainesville, February 4, 1919; male, Gainesville, May 2, 1922 (T. P. Winter); female, Gainesville, May 7, 1922; female, male, Gainesville, May 10, 1922 (T. P. Winter); male, Gainesville, May 14, 1914; male, Gainesville, May 16, 1914; 2 females, Gainesville May 21, 1914; 2 females, Gainesville, May 22, 1922 (T. P. Winter); female, Gainesville, May 29, 1914; female, Gainesville, July 15, 1916; male, Gainesville, July 16, 1918 (P. W. Fattig); male, Gainesville, July 17, 1916; female, Gainesville, September 16, 1918 (P. W. Fattig); 5 females, Gainesville, September 26–October 2, 1914; female, Gainesville, October 1, 1922; female, Gainesville, November 14, 1921; 3 females, Gainesville (J. R. Watson); 2 females, Lake Miccosukee, Jefferson County, June 5, 1922 (J. S. Alexander); female, Woodville, September 1, 1915 (Rehn and Hebard); female, Lake Jackson, Leon County, June 7, 1922 (J. S. Alexander); 2 males, Lanark, July 20, 1909; 2 males, Apalachicola, July 20–23, 1909 (J. C. Bradley); female, DeFuniak Springs, October 16–19, 1914; female, Pensacola, October 11–14, 1914; female, Marathon, December 5, 1912 (Frederick Knab); female, Lake Okechole, July 7, 1914; 3 females.

Georgia: Male, St. Simon's Island, June 4, 1911; female, St. Simon's Island, June 8, 1911; 7 females, 4 males, Billy's Island, Okefenokee Swamp, June, 1912; female, Billy's Island, Okefenokee Swamp, July, 1912; 9 females, 4 males, Billy's Island, Okefenokee Swamp, September 1–5, 1913; 2 females, Billy's Island, Okefenokee Swamp; female, Okefenokee Swamp; female, Chesser's Island, June 2, 1922; female, Chesser's Island, June 14, 1922; 2 females, male, Bainbridge, September 3–7, 1910 (J. C. Bradley); 2 females, 5 males, Spring Creek, Decatur County, June 7–23, 1911 (J. C. Bradley); 2 females, 2 males, Spring Creek, Decatur County, July 16–29, 1912; 5 females, Spring Creek, Decatur County, September 23–October 3, 1910 (J. C. Bradley); 2 females, Brinson, July 29, 1916; 2 females, Deenwood, Waycross, July 16–18, 1916; female, Groveland, July 28, 1913 (J. C. Bradley); female, Fort Valley, July 10, 1900; female, Concord, August 15, 1910; female, Atlanta, June 10, 1901; male, Stone Mountain, July 11, 1909; female, Stone Mountain, August 3, 1913; female, Stone Mountain, September 9, 1910; male, Silver Lake, Fulton County, August 10, 1913; female, Tallulah Falls, June 19–25, 1909 (J. C. Bradley); female, Toccoa, August 8; male, Pinacle Peak, Rabun County, August 20, 1913; female, Sandfly, Savannah, July 13–14, 1916; female, Tallapoosa, July 27, 1908; female, Fannin County, August, 1904; female, Chickamauga National Park, July 15, 1898 (W. L. Jr.); female, Camp Thomas (J. C. Mason); female.

Illinois: 3 females, Meredosia, August 22, 1898 (F. M. McE.); female, Havana, 1894.

Indiana: Female, Decker, August 11, 1899 (W. S. Ellis); female, Vincennes, July 15, 1922 (J. J. Davis); female (A. G. Burrell).

Kentucky: Female, Midway, August 8, 1923 (G. G. Ainslie); female, Owensboro (G. G. Ainslie); female, Vanorsdall, September, 1899; female, August 17, 1897.

Louisiana: Female, Mound, July 30, 1924 (H. E. Wallace); male, Cameron, June 12, 1905; male, Johnson's Bayou, July 26, 1906 (J. D. Mitchell); male, Mandeville; female, Bunkie, August 2, 1909 (E. S. Tucker); male, Alexandria, July 30, 1908 (E. S. Tucker).

MISSISSIPPI: Female, Biloxi, June 12, 1915; female, male, Scott, August, 1919 (C. H. Brannon); female, Meridian, July 17, 1917 (W. D. Pierce); female, Lauderdale, July 15, 1915 (J. L. E.); female, Starkville, May 13, 1912 (R. A. Hickman); female, Agricultural College, March 10, 1922 (L. R. Pylant); female, Agricultural College, April 5, 1922 (C. A. Luper); female, Agricultural College, September, 1915 (E. L. Brien); female, Agricultural College, October 16 (G. B. Ray); female, Agricultural College (B. F. Ware); female, Agricultural College (W. F. Swan); female, Agricultural College (R. P. Woods); male, Eden, August 1 (J. M. Russell); male, Leflore County, July, 1919 (R. R. Spann); male, Utica, August; female, Star, August 23, 1921 (C. E. Ross); female, Ora, July 4, 1914 (F. Rogers).

MISSOURI: Female, Poplar bluff, September 4, 1915; female, male.

NEW JERSEY: Female, Manumuskin, August 17, 1902 (E. Daecke); female, Manumuskin, August 26, 1900; female, Weymouth, August 16, 1904; female, 2 males, Weymouth, September 8, 1915 (E. L. Diven); 2 females, 3 males, Menantico, July 27, 1923; male, Menantico, July 27, 1923 (J. C. Bradley); female, Hammonton, September 6, 1903; 2 females, DaCosta, July 28. 1902 (E. Daecke); female, male, DaCosta, August 3, 1902 (E. Daecke); male, Pitman, August 7, 1916; female, Iona, July 13, 1902 (E. Daecke); female, National Park, August 4, 1908; female, Brown's Mills "in the Pines", August 3, 1919; 5 males, Lucaston, September 2, 1901; 2 females, 2 males, Lakehurst, September 2; female, male, Cassville, August 17, 1910; female, Milltown, August 3; 2 females, Midwood, August 18, 1910; female, Fort Lee, September 29; female.

NEW YORK: Female, Mattituck, L. I., August 10, 1921; female, Amagansett, L. I., August 10, 1912; female, Selden, L. I., August 31, 1916 (W. T. Davis); female, Long Island, May 27, 1903; female.

NORTH CAROLINA: Female, Wilmington, June 10, 1919 (Max Kislink, Jr.); 2 females, Wilmington, June 17, 1919 (Max Kislink, Jr.); female, Havelock, Lake Ellis, June 19–24, 1905 (F. Sherman); female, Fayetteville, July, 1907 (L. M. Smith); female, Ellis, June 20, 1905 (C. S. Brimley); female, Southern Pines, June 14 (A. H. Manee); 4 females, Southern Pines, July 17, 1918; female, Southern Pines, July 22 (A. H. Manee); female, Southern Pines, August 12, 1904 (G. M. Bentley); female Southern Pines, August 12. 1918; female, Southern Pines, August 30, 1918; female, Southern Pines, August 31, 1918; male, Southern Pines, September 24, 1918; female, Southern Pines, October 3, 1918; female, Southern Pines; female, Greenville, July 6, 1906 (R. S. Woglum); female, Raleigh, July 25, 1891 (G. W. McCarthy); female, Raleigh, September (C. S. Brimley); female, Thomasville, September 2, 1902 (F. Sherman); male, Bushnell, September 1, 1904 (F. Sherman); female, Elkin, July (F. Sherman); female, Retreat (H. G. Hubbard); female, Terra Ceia, August, 1919 (F. Sherman); female, Oakdale, August 22, 1902 (F. Sherman); female, male.

SOUTH CAROLINA: 3 females, male.

TENNESSEE: Male, Boat Mountain, August 3, 1910; female, Knoxville, May 30, 1918 (G. G. Ainslie); 3 females, Knoxville, August 15; female, Knoxville, September 6, 1911; female, Knoxville, September 11, 1908; female, Knoxville, September 20 (G. G. Ainslie); female, Knoxville, September 21, 1910; female, Knoxville, September 26, 1913; female, Knoxville; 9 females, 3 males, Knox County (G. G. Ainslie); female, Grassy Cove, Cumberland Co., July 15, 1922 (T. H. Hubbell); male, Black Mountain, Cumberland County, May–August, 1917 (A. C. Gill); female, Allardt, Fentress County, August

20, 1922 (T. H. Hubbell); female, Harriman, September 3; female, Nashville (G. G. Ainslie); female, Hurricane Mills, July, 1912 (G. G. Ainslie); female, Pittsburg Landing, July 25, 1896 (C. Cadle); 2 females, Memphis; female, Redfoot Lake, Obion County, September 5, 1919 (F. M. Gaige); male.

TEXAS: 2 females, Cypress Mills; 2 males, southeast Texas, 1918 (W. W. DeCell); female.

VIRGINIA: Female, Drummond Lake, October 29, 1906 (H. S. Barber); female, Greenwood, September 1 (C. Dinwuddie); male, Richmond, August 9, 1916 (Wm. T. Davis); female.

WEST VIRGINIA: Female, 5 males, Milville (J. C. Bradley).

The color of the pubescence above varies from bright scarlet to pale yellow; many variations in color between these two extremes are to be found in all parts of the range of this species. The pale yellow specimens are not confined to the southern portion of its range as suggested by Bradley (1916) in separating the yellow form as the species *comanche*, but are found in material from New Jersey and other northern points. The variety *comanche* also exhibits the same variation in color between scarlet and pale yellow, has a more western distribution, and can be separated from *occidentalis* on structural characters.

90. DASYMUTILLA OCCIDENTALIS var. COMANCHE (Blake)

Mutilla (*Sphaerophthalma*) *comanche* BLAKE, Trans. Amer. Ent. Soc., vol. 3, p. 234, 1871, female, male.

Sphaerophthalma comanche BLAKE, Trans. Amer. Ent. Soc., vol. 13, p. 211, 1886, female, male.

Mutilla comanche DALLE TORRE, Cat. Hymen., vol. 8, p. 25, 1897.—FOX, Trans. Amer. Ent. Soc., vol. 25, p. 237, 1899, female, male.—MELANDER, Trans. Amer. Ent. Soc., vol. 29, p. 296, 1903.

Ephuta (*Ephuta*) *comanche* ANDRÉ, Gen. Ins., vol. 1, fasc. 11, p. 58, 1903, female, male.

Types.—Male and female. Texas, in collection of American Entomological Society of Philadelphia.

Distribution.—Texas, Oklahoma, Colorado, Kansas, Nebraska, Iowa, and South Dakota. (Fig. 23.)

SPECIMENS EXAMINED

COLORADO: Female, Holly, September 8, 1898; female, Lamar, July 10, 1899; 3 females, 6 males, La Junta, August 3 (Lantz); female, Snyder, August 2, 1899; female, Fort Collins, July 19, 1902; 2 females.

IOWA: Female, Council Bluffs, July 19, 1914 (T. W. Dorland).

KANSAS: Female, Neosho County (R. H. Beamer); 2 females, 2 males, Allen County; female, Ottawa, July 13, 1924 (W. J. Brown); female, Douglas County, July 31, 1919 (W. E. Hoffmann); female, Douglas County, August 3, 1920 (W. E. Hoffmann); male, Douglas County, August 4, 1919 (W. E. Hoffmann); female, Wabaunsee County (Forrest Anderson); female, Butler County, 1916 (R. H. Beamer); 2 females, Riley County, July 21 (Popenoe); male, Riley County, August 19 (Popenoe); female, Riley County, August (Popenoe); female, Riley County (Popenoe); 2 males, Riley County, July

22 (G. A. Dean) ; male, Riley County, July 23 (G. A. Dean) ; female, Riley County, August 18 (G. A. Dean) ; male, Riley County, August 8 (J. B. Norton) ; female, Riley County (Marlatt) ; male, Wellington (E. G. Kelly) ; male, Salina (Knaus) ; female, Kingman County, 1916 (R. H. Beamer) ; female, Medora, September 21, 1913 (Horton) ; 2 females, Medora (W. Knaus) ; female, Pratt County, June 27, 1911 (F. X. Williams) ; female, Russell County, July 26, 1912 (F. X. Williams) ; female, Rooks County, August 9, 1912 (F. X. Williams) ; female, Phillips County, August 30, 1912 (F. X. Williams) ; female. Graham County, August 16, 1912 (F. X. Williams) ; female, Sheridan County (F. X. Williams) ; male, Decatur County (F. X. Williams) ; female, Seward County, August 18, 1911 (F. X. Williams) ; female, Morton County, August 5, 1911 (F. X. Williams) ; male, Hamilton County, July (S. J. Hunter) ; 2 females, Wallace County, September 2; female, Wallace County (F. H. Snow) ; female, Wallace County (F. X. Williams) ; 3 females, male, Cheyenne County (F. X. Williams) ; 2 females (F. H. Snow).

Nebraska: Female, Nemaha, August 20, 1914 (Gertrude McCandless) ; 10 females, Plattsmouth, September 3, 1923 (C. B. Philip) ; male, Louisville, July 31, 1914 (E. G. Anderson) ; female, Omaha, August 11, 1913 (L. T. Williams) ; female, Niobrara, August 2, 1902 (W. D. Pierce) ; female, Benkelman, October 5 (Lantz) ; female, Haigler, July 6, 1911 (J. T. Zimmer) ; male, Haigler, August 19, 1909 (C. H. Gable) ; male, Halsey, July 23, 1912 (J. T. Zimmer) ; female, Halsey, August 9, 1925 (R. W. Dawson) ; 2 females, Halsey, September 20, 1911 (J. T. Zimmer) ; 2 females, male, Scottsbluff, August 5, 1923 (Leonard Worley) ; female, Mitchell, June 24, 1916 (C. E. Mickel) ; 2 females, Chadron, August, 1888; female, Fort Robinson, August, 1888; female, Glen, Sioux County, August 20, 1906 (L. Bruner) ; 2 males, Pine Ridge (July).

Oklahoma: Female, Ardmore, August 18, 1905 (C. R. Jones) ; female, Ardmore, August 18 (F. C. Bishopp) ; female, Ardmore; female, Payne County, June 20, 1925 (W. J. Brown) ; male, Payne County, July 5, 1925 (W. J. Brown) ; female, Payne County, September 21, 1923 (W. J. Brown) ; female, Shamrock, July, 1920 (C. H. Heppeard).

South Dakota: 4 females, Capa, August 18, 1921 (H. C. Severin) ; female, Bijou Hills, August 31, 1923 (H. C. Severin) ; female, Mobridge, August 24, 1924 (H. C. Severin) ; male, Philip, August 8, 1924.

Texas: Female, Victoria (A. W. Morrill) ; 13 females, 4 males, Wharton, June 24, 1917; female, Wharton, August 15 (A. McLaughlin) ; female, Wharton, August 23 (A. McLaughlin) ; female, Wharton, September 5 (A. McLaughlin) ; female, Wharton, July 30 (C. R. Jones) ; female, male, Richmond, June 22, 1917; female, Rock Island, June 27, 1922 (Grace O. Wiley) ; 2 females, Rock Island, July 8, 1922 (Grace O. Wiley) ; female, Rock Island, August 11, 1922 (Grace O. Wiley) ; female, Colorado County, June 3, 1922 (Grace O. Wiley) ; 2 females, Colorado County, July 18, 1922 (Grace O. Wiley) ; female, Colorado County, July 31, 1922 (Grace O. Wiley) ; female, Colorado County, August 25, 1922 (Grace O. Wiley) ; female, Colorado County, September 2, 1922 (Grace O. Wiley) ; female, Alvin; 2 females, Beaumont, August 10, 1917 (E. L. Diven) ; female, Beaumont, August, 1918 (G. E. Riley) ; female, College Station, July 28, 1919 (H. J. Reinhard) ; female, College Station, September 5, 1919 (H. J. Reinhard) ; female, Calvert, August 10 (A. W. Morrill) ; female, Calvert, August 15 (A. W. Morrill) ; female, male, Calvert; 2 females, Henderson, July 28, 1910 (E. S. Tucker) ; female, Mineola, July 19, 1906 (Bishopp and

Jones); 6 females, 4 males, Rosser, June 28, 1905 (C. R. Jones); 2 females, male, Rosser, July 6, 1905 (C. R. Jones); 3 females, male, Rosser, July 6, 1905 (F. C. Bishopp); female, Ladonia (C. R. Jones); female, Paris (C. R. Jones); female, Paris; female, Barstow, July 22, 1905 (J. C. Crawford).

It has been impossible to find any character or combinations of characters which will separate the males of *comanche* from those of *occidentalis.* The females are easily distinguished by the coarser sculpture of the second abdominal segment, the black pubescence on the dorsum of the propodeum and the character of the pubescence generally, recumbent in *occidentalis*, more or less erect in *comanche*, giving the latter a rather shaggy appearance as compared with the smooth, silky appearance of *occidentalis.* Using these characters to separate the females the two group themselves into a series from the Eastern States, that is, Louisiana and Arkansas eastward, and into a series from Central Western States, that is, the distribution given above. Specimens that are undoubtedly *occidentalis* show color variations ranging from pale yellow to scarlet, while specimens from the west, agreeing in integumental characters with the type specimen show the same color variation. Since the two forms are so readily recognizable by the characters mentioned above and since a series separated in this manner shows such a wide color variation it does not seem possible to define *comanche* as a color variety of *occidentalis* as has been previously suggested. I have seen no female specimens of *comanche*, agreeing with the type in sculpture, from Florida or any of the southeastern States.

The males of *comanche* and *occidentalis* have been found to be inseparable except on the basis of the information given in the locality label of the specimen, that is, eastern specimens or western specimens. The type male has been examined and the genitalia are the same as those in *occidentalis.* The characters suggested by Fox (1899) in his key as separating the two do not hold and it has seemed impossible to find any accurate means of distinguishing them. When the hosts and other biological data of the two forms become known, *comanche* may prove to be a valid species but for the present it seems best to regard it as a western variety of *occidentalis.*

91. DASYMUTILLA CALORATA, new species

Female.—Black, the front, vertex, dorsum of thorax except the propodeum, second abdominal tergite except the basal sixth, and abdominal tergites three to five clothed with long, erect, ochraceous hairs. Length, 21 mm.

Head black, clothed with long, semi-erect, black hairs, except on the front and vertex which are clothed with ochraceous hairs; mandibles acute at the tip with a tooth within; anterior portion of clypeus concealed by a thick fringe of long, blackish hairs; first segment of flagellum slightly shorter than segments two and three united; antennal scrobes distinctly carinate above; front, vertex and genae with very large, coarse, and more or less confluent punctures; the genae bounded posteriorly by an obscure carina; relative widths of head and thorax, 11–14.

Thorax black, clothed with long, black, erect hairs except the dorsum (not including the propodeum with long, ochraceous hairs); dorsum of thorax very coarsely and deeply punctured (almost reticulate); scutellar scale present; propleura coarsely punctate; cephalic half of mesopleura very finely punctate except for a few coarse punctures above, the posterior half very coarsely and confluently punctate; metapleura glabrous, with fine, sparse punctures near the cephalic margin, and scattered coarse punctures on the ventral half; sides of propodeum coarsely and closely punctate; posterior face of propodeum coarsely and deeply reticulate; dorsum of propodeum with long, erect, black hairs.

Abdomen black; first abdominal segment short, subnodose, clothed with long, black hairs, the tergite coarsely punctured, the median carina of the sternite produced anteriorly into a prominent tooth; second abdominal tergite glabrous on the extreme basal margin, very coarsely, closely and deeply punctured otherwise, the basal sixth with long, black, erect hairs, the apical five-sixths with long, erect, ochraceous hairs; tergites 3–5 with strong, close punctures and long, erect, ochraceous hairs; pygidial tergite with a fringe of ochraceous hairs at the base, the pygidium coarsely, longitudinally rugose; second sternite with very large, coarse, close punctures; sternites 3–5 with strong, close punctures; sternites 2–5 clothed with long, black hairs, except a few long ochraceous hairs on the lateral apical margins (more conspicuous on the fifth sternite).

Legs black, clothed with black hairs.

Holotype.—Female, Pecos, Texas, 1919 (C. P. Daley), in entomological collection of the University of Minnesota.

Paratypes.—Female, Marathon, Texas, July 1–2, 1916; female. Barstow, Texas, July 20, 1905 (J. C. Crawford); female, Comanche County, Kansas, 1916 (R. H. Beamer); female, Fort Collins, Colorado, July 22, 1901. Paratypes in collections of United States National Museum, American Museum of Natural History, University of Kansas, and Colorado State Agricultural College.

This species is related to *klugii* and *clotho.* All are exceedingly coarsely sculptured and have the genae bounded posteriorly by an obscure, irregular carina. *Calorata* is distinguished from these by the ochraceous pubescence which clothes the head, thorax, and abdomen.

92. DASYMUTILLA KLUGII (Gray)

Mutilla klugii GRAY, Griffith's Anim. King., Ins., vol. 2, p. 516, pl. 71, fig. 2, 1832, female.—SMITH, Cat. Hymen. Brit. Mus., vol. 3. p. 55, 1855, female.—DALLE TORRE, Cat. Hymen., vol. 8, p. 52, 1897, female.

Mutilla orcus CRESSON, Proc. Ent. Soc. Phila., vol. 4, p. 428, 1865, female, male.—BLAKE, Trans. Amer. Ent. Soc., vol. 7, p. 243, 1879, male, female.—DALLE TORRE, Cat. Hymen., vol. 8, p. 69, 1897, female, male.—FOX, Trans. Amer. Ent. Soc., vol. 25, p. 238, 1899, female, male.—MELANDER, Trans. Amer. Ent. Soc., vol. 29, p. 296, 1903, female, male.

Mutilla (*Sphaerophthalma*) *orcus* BLAKE, Trans. Amer. Ent. Soc., vol. 3, p. 233, 1871, female, male; Trans. Amer. Ent. Soc., vol. 4, p. 71, 1872, male, female.

Sphaerophthalma orcus BLAKE, Trans. Amer. Ent. Soc., vol. 13, p. 209, 1886, female, male.

Sphaerophthalma klugii CAMERON, Biol. Centr.-Amer., pt. 123, Hymen., vol. 2, p. 363, 1895.)

Ephuta orcus COCKERELL, Proc. Dav. Acad. Nat. Sci., vol. 7, p. 140, 1898.

Ephuta (*Ephuta*) *orcus* ANDRÉ, Gen. Ins., vol. 1, fasc. 11, p. 62, 1903, female, male.

——— *klugi* ANDRÉ, Gen. Ins., vol. 1, fasc. 11, p. 73, 1903, female.

Neotype.—Female, Rio Grande, Brewster County, Texas, June 13–17, 1908 (Mitchell and Cushman); in collection of United States National Museuem. The type of *orcus* is in the collection of the American Entomological Society of Philadelphia.

Distribution.—Texas, Kansas, Colorado, New Mexico, Utah, Arizona, Mexico.

SPECIMENS EXAMINED

ARIZONA: Female, Douglas, August 14, 1924 (H. Letcher); male, Douglas, August (F. H. Snow); female, Bowie, July 14, 1917; male, Fort Grant, Pinaleno Mountains, July 15, 1917; female, Fort Grant, Pinaleno Mountains, July 18, 1917; female, 5 males, Fort Grant, Pinaleno Mountains, July 15–19, 1917; male, Post Creek Canyon, Pinaleno Mountains, Fort Grant, July 15–18, 1917; male, Chiricahua Mountains (R. B. Mann); male, Nogales, June 27, 1903 (Oslar); female, Carr Canyon, Huachuca Mountains, August, 1905 (H. Skinner); female, Huachuca Mountains, August 15, 1903 (Oslar); female, Huachuca Mountains, July 8; female, Huachuca Mountains, July 20; female, Santa Rita Mountains, June (F. H. Snow); 3 females, Santa Rita Mountains, July (F. H. Snow); female, male, Santa Rita Mountains, August 29, 1924 (A. A. Nichol); 3 females, Bonita, Gowdy Creek Canyon, July 18, 1917 (H. H. Knight); female, Santa Catalina Mountains, September 10, 1924 (A. A. Nichol); male, Florence, June 24, 1903; female, Florence, July 13, 1903 (C. R. Biederman); male, Florence, July 29, 1917; female, Florence (C. R. Biederman); 2 females, Buckeye, August 7, 1919; female, Buckeye, August 11, 1913 (O. C. Bartlett); female, male, Sacaton, July 25, 1924 (J. A. Harris, Jr.); female, Sacaton, July 26, 1924 (J. A. Harris, Jr.); female, Sacaton, July 27, 1924 (J. A. Harris, Jr.); female, Sacaton, July, 1924 (J. A. Harris, Jr.); female, Phoenix, August, 1917; 2 females, Payson, July 25, 1892; female, Prescott, August, 1917; female, Prescott; 3 females, Winslow (Wickham); female, Patagonia Mountains, May 15, 1903 (Oslar); female, Oak Creek Canyon, July (F. H. Snow); 2 females, male, Oak Creek Canyon, August (F. H. Snow); female, August, 1902 (F. H. Snow); 3 females, male.

COLORADO: Female, Rifle, July 25, 1900; female, Grand Junction, August 31, 1901; female.

KANSAS: Female, Medora (W. Knaus).

MEXICO: Female, Camargo, Tamaulipas, September 2, 1917 (A. Busck); female. Torreon, Coahuila, July 10, 1918; female, Lerdo, Durango, July 26, 1918; female.

NEW MEXICO: Female, Las Cruces, June 29; female, Las Cruces, August 30 (Townsend); female, Las Cruces, September, 1894 (Cockerell); female, Las Cruces, September (Hare); 4 females, Las Cruces; male, Mesilla, June 22 (Cockerell); male, Mesilla; female, Fillmore Canyon, Organ Mountains, September 1 (Townsend); female, La Cueva, Organ Mountains, September 3 (Townsend); female, male, Socorro; female, Aden, July 12, 1917; male, La Cruces, July 12, 1917 (R. C. Shannon); 2 females, Alamogordo, June 6, 1902; female, Alamogordo, July 19, 1906 (G. v. K.); female; Alamogordo, July 26, 1906 (G. v. K.); 2 males, Albuquerque, July 19, 1902 (Oslar); female, Albuquerque, September 12 (Cockerell); female, Fort Wingate, August 9, 1909 (John Woodgate); female.

TEXAS: Female, Brownsville, June 7, 1907 (R. A. Cushman); female, Falfurrias, May 8, 1907 (A. C. Morgan); female, Victoria, June 10, 1907 (J. D. Mitchell); female, Victoria, July 2, 1910 (A. McLaughlin); female, Victoria, October 29, 1904 (A. McLaughlin); female, Cuero, June 19 (Townsend); female, Runge, September 21, 1906 (J. C. Crawford); 3 females, Cotulla, May 12, 1906 (J. C. Crawford); 3 females, Cypress Mills; female, Eastland County, April 23, 1921 (Grace O. Wiley); female, Eastland County, May 23, 1921 (Grace O. Wiley); female, Eastland County, May 27, 1921 (Grace O. Wiley); 2 males, Eastland County, May 31, 1921 (Grace O. Wiley); 4 females and 5 males, Eastland County, June 4, 1921 (Grace O. Wiley); female and male, Eastland County, June 5, 1921 (Grace O. Wiley); female, Eastland County, June 6, 1921 (Grace O. Wiley); female and 3 males, Eastland County, June 8, 1921 (Grace O. Wiley); 3 males, Eastland County, June 9, 1921 (Grace O. Wiley); 2 females, Eastland County, June 10, 1921 (Grace O. Wiley); female and male, Eastland County, June 11, 1921 (Grace O. Wiley); 2 females, Eastland County, June 13, 1921 (Grace O. Wiley); female, Eastland County, June 16, 1921 (Grace O. Wiley); male, Eastland County, June 20, 1921 (Grace O. Wiley); female, Eastland County, September 3, 1920 (Grace O. Wiley); female, Fedor; female, Hondo, May 20, 1906 (J. D. Mitchell); 4 females, Del Rio, June 22–27 (Wickham); male, Devil's River, May 3, 1907 (F. C. Bishopp); female, Devil's River, July 2, 1917; female, 18 males, Langtry, May 17, 1918 (J. C. Bradley); female, male, Chancellor, Pecos County, July 5, 1917; 2 females, Juno, July 3, 1917; female Pecos, June 26, 1908 (W. A. Hooker); male, Sheffield, July 5, 1917; male, Colorado, June 21, 1903 (W. A. Hooker); female, Alpine, June 28–30 (Wickham); male, Marathon, July 1–2, 1916; 5 females and 2 males, Rio Grande, Brewster County, June 13–17, 1908 (Mitchell and Cushman); female, male, Phantom Lake, Fort Davis Quad, June 2, 1916 (F. M. Gaige); female, Phantom Lake, Fort Davis Quad, June 19, 1916 (F. M. Gaige); female, Phantom Lake, Fort Davis Quad, July 13, 1916 (F. M. Gaige); female, Cherry Canyon, Fort Davis Quad, July 8, 1916

(F. M. Gaige); female, Chisos Mountains (W. B. Phillips); female, Fort Hancock, July 9, 1917; male, Fabens, July 9, 1917 (H. H. Knight); male, El Paso, July 11, 1917; female, El Paso; 6 females and male.

UTAH: Female, American Fork, August 24, 1903; female, Chad's Ranch, July 22 (Wickham).

George Gray described and figured *klugii* in 1832 and stated that it came from South America. Dr. J. Waterston of the British Museum advises me that "the actual type of *M. klugii* is no longer extant but we have a number of conspecific specimens standing under this name and going back to 1863 probably compared at that date (1863) by Smith." The material standing under this name in the British Museum comes from Mexico and Arizona. Gray's figure is a good representation of the species that is known from Texas, New Mexico, Arizona and Mexico as *orcus* Cresson, and it is certain that Gray must have been mistaken in giving the locality as South America. Inasmuch as the type of Gray's species has been lost a new type is designated here. Specimens of this species have been compared with the types of Cresson's *orcus* and found to be identical. Specimens from southern United States have been compared with the material in the British Museum and found to be the same. The genitalia are practically identical with those of *occidentalis*, consequently are not figured.

93. DASYMUTILLA CLOTHO (Blake)

Mutilla (*Sphaerophthalma*) *clotho* BLAKE, Trans. Amer. Ent. Soc., vol. 4, p. 72, 1872, female.

Sphaerophthalma clotho BLAKE, Trans. Amer. Ent. Soc., vol. 13, p. 212, 1886, female.

Mutilla clotho DALLE TORRE, Cat. Hymen., vol. 8, p. 25, 1897.

Mutilla comanche FOX, Trans. Amer. Ent. Soc., vol. 25, p. 237, 1899, female (in part).

Mutilla comanche var. *clotho* MELANDER, Trans. Amer. Ent. Soc., vol. 29, p. 296, 1903, female.

Type.—Female, Texas, in collection of Museum of Comparative Zoology, Cambridge, Massachusetts.

Distribution.—Oklahoma and Texas.

SPECIMENS EXAMINED

OKLAHOMA: Female, Elgin, July, 1914 (Skinner).

TEXAS: Female, Victoria, June 3, 1910 (J. D. Mitchell); female, Victoria, July, 1906 (A. McLaughlin); female, Victoria, July 27, 1906 (W. W. Yothers).

Blake's type has been examined and found to be a valid species belonging to the group having the posterior margin of the genae subcarinate. It is much more coarsely sculptured throughout than *occidentalis* var. *comanche*, with which it was united by Fox. The subcarinate genae, the coarse sculpture of the head, and the black head and thorax will at once distinguish it. Blake described this species from a unique which was returned to the Museum of Comparative Zoölogy at Cambridge, Mass., and which is in the collections there at the present time.

94. DASYMUTILLA MAGNA (Cresson)

Mutilla magna Cresson, Proc. Ent. Soc. Phila., vol. 4, p. 385, 1865, female.—Dalle Torre, Cat. Hymen., vol. 8, p. 56, 1897.—Fox, Trans. Amer. Ent. Soc., vol. 25, p. 237, 1899, female.—Melander, Trans. Amer. Ent. Soc., vol. 29, p. 296, 1903, female, pl. 4, fig. 7.

Mutilla (*Sphaerophthalma*) *magna* Blake, Trans. Amer. Ent. Soc., vol. 3, p. 235, 1871, female.

Sphaerophthalma magna Blake, Trans, Amer. Ent. Soc., vol. 13, p. 214, 1886, female.

Ephuta (*Ephuta*) *magna* André, Gen. Ins., vol. 1, fasc. 11, p. 61, 1903, female.

Type.—Female, Cape St. Lucas, Lower California, in collection of American Entomological Society of Philadelphia.

The male of this species has heretofore been unknown; it may be described as follows:

Male.—Black, clothed with whitish pubescence on the head and thorax, pale yellowish pubescence on the abdomen. Length, 17 mm.

Head black, clothed with sparse black hairs, except the front and vertex clothed with long, erect white hairs, and a very few scattered pale hairs on the genae; mandibles tridentate; clypeus bidentate medially at the apical margin; first segment of flagellum five-sixths the length of the second; scape bicarinate beneath, clothed with black hairs; antennal scrobes strongly carinate above; front, vertex and genae with moderate, shallow, more or less confluent punctures; relative widths of head and thorax 8–12.

Thorax black; prothorax, mesonotum, scutellum, metanotum, and tegulae at base and inner margin clothed with long, semierect, white hairs; remainder of thorax clothed similarly with black hairs; pronotum, mesonotum and scutellum with large, deep confluent punctures, almost reticulate on the metanotum; propleura irregularly punctate with large, moderate, and also fine punctures; mesopleura with moderate, well-separated punctures on the anterior one-third, the posterior two-thirds with large, confluent punctures; metapleura for the most part glabrous, a few large punctures ventrally; sides of propodeum with very large, close punctures, almost reticulate; dorsum and posterior face of the propodeum reticulate, the reticulations large and deep; tegulae glabrous, except the basal, and inner lateral margins punctate.

Abdomen black; first segment strongly nodose, carinate beneath but not with a prominent tooth, basal medial area of the tergite glabrous, remainder of tergite closely, confluently punctate; second tergite moderately and closely punctate, the punctures very close laterally, a little more separated on the disk; tergites 3–6 with moderate, close punctures; last tergite punctate at the basal margin, the apical two-thirds microscopically rugose, a fringe of pale hairs at the apical margin; first tergite and anterior two-thirds of second tergite clothed with long, erect, black hairs, posterior third of second tergite, tergites 3–6, and basal margin of last tergite clothed with long, erect, pale yellowish hairs; sternite two moderately punctate, the punctures closer at the sides, also with a large, median pit, densely filled with fine hairs; sternites 3–6 sparsely punctured at the apical margin; last sternite with moderate, separated punctures; first sternite and basal margin of second sternite with very sparse, long, erect pale hairs; disk of second sternite with sparse, erect, black hairs; sternites 2–5 with a thin, apical fringe of pale hairs; sternites 6–8 clothed with sparse black, erect hairs.

Legs black, clothed with long, black hairs.

Wings very dark fuscous.

Allotype.—Male, Florence, Arizona, September 4, 1901 (C. R. Biederman), in collection of American Entomological Society.

Distribution.—Arizona, California, Lower California, Mexico.

SPECIMENS EXAMINED

ARIZONA: 2 females, Santa Rita Mountains, July 16, 1921; female, Tucson, June 6, 1903 (Oslar); female, male, Tucson, July 3; female, Tucson, July 9, 1921; 2 females, Tucson, July 11, 1920; female, Tucson, July 22, 1917; female, Tucson, July 28, 1892; female, Tucson, August 24 (Wickham); female, Sabino Canyon, Santa Catalina Mountains, May 2, 1919 (W. D. Edmonston); female, Sabino Canyon, October 4, 1923 (C. T. Vorhies); 3 females, near Kits Peak, Baboquivari Mountains, August 7–9, 1916; male, Sonora Road Canyon, Tucson Mountains, July 25, 1907 (Hebard and Rehn); female, Black Dike Prospect, Sierritas, July 26–29, 1916; female, Pima County, July 26, 1918; female, Mesa, July 25, 1917 (W. D. Pierce); female, Mesa, October 17 (Cockerell); female, Scottsdale, June 5, 1917 (M. E. Kimsey); female, Florence, May 8, 1903; male, Florence, June 24, 1903; 4 females, Florence, July 23, 1903 (C. R. Biederman); male, Florence, July 25, 1903 (C. R. Biederman); male, female, Florence, September 20, 1903 (C. R. Biederman); female, Phoenix, June 20; female, Phoenix, June 30 (E. E. Russell); male, Phoenix, July 5, 1913 (E. E. Russell); female, Phoenix, August 3, 1917; female, Phoenix, September 13; female, Phoenix, November 8; male, Phoenix, November 18; 2 males, Congress Junction, July (F. H. Snow); female, Yuma, summer, 1900 (H. Brown); female, Yuma, May 29, 1909 (F. C. Pratt).

CALIFORNIA: Female, male, Brawley, Imperial county, August 9, 1914 (J. C. Bradley).

Lower California: 2 females, San Antonio, Dist. Sur. July 18, 1919 (Ferris); male, between San Jose del Cabo and Triunfo, 1911.

Mexico: Female, Envir de Guadalajara, Estat de Jalisco, 1901 (M. Diguet); 2 females, Hermosillo, Sonora, September 1, 1908.

The female of *magna* is very closely related to the female of *magnifica*. It has the same general habitus, and the same very prominent carina bounding the genae posteriorly. It differs from *magnifica* principally in the color of the vestiture. It is practically certain that the male described above is the male of this species; it is very closely related to the male of *magnifica*. The genitalia of the two are identical and for that reason only those of *magnifica* are figured. Like the female *magna* it differs principally from *magnifica* in the color of the vestiture. These color differences are very marked and striking and there can be no question but that both *magna* and *magnifica* are valid species.

95. DASYMUTILLA MAGNIFICA, new species

Plate 3, fig. 24

Female.—Black, abdomen red; length 21 mm. Head very dark red, covered with long, black, erect and semierect hairs; mandibles acute at the tip, a small tooth within; clypeus concealed by long hairs; scape clothed with stiff hairs; first segment of flagellum equal to two-thirds the length of segments 2–4 united; antennal scrobes strongly carinate above; front, vertex, occiput, and genae irregularly, coarsely and confluently punctate; genae with a prominent, longitudinal carina; relative widths of head and thorax, 7–9.

Thorax very dark red; slightly less than three-fourths as broad as long; dorsum coarsely and deeply reticulate, covered with long, black, erect and semierect hairs; propleura coarsely punctate and clothed with sparse, black hairs; mesopleura with a ventro-dorsal, elevated ridge; the latter coarsely punctate and with a row of very long, dense black hairs; metapleura coarsely punctate on the ventral third, impunctate otherwise and with a few, scattered, black hairs; sides of propodeum coarsely, confluently punctate with a few scattered, black hairs; posterior face of the propodeum coarsely reticulate above and at the sides, below medially with irregular, coarse punctures, clothed with sparse, long, black hairs.

Abdomen very dark red; first tergite short, coarsely punctate and clothed with long, black hairs; second tergite coarsely and deeply reticulate; sculpture of remaining tergites concealed by the pubescence; tergites 2–6 with very dense, long, orange-red, erect and semierect pubescence; basal two-thirds of pygidial area longitudinally rugose, the apical third transversely rugose; ventral carina of first sternite with a prominent anterior tooth; second sternite with coarse, more or less confluent punctures, and sparse, erect black hairs; apical margins of sternites 2–5 with a dense fringe of long, yellow hairs with a few long, black hairs intermixed.

Legs black, densely clothed with very long, black hairs.

Holotype.—Female, Pima County, Arizona, July 26, 1918, in entomological collection of the University of Minnesota.

Male.—Black, abdomen red; length 18 mm. Head black with sparse, black, erect hairs; manibles tridentate; clypeus bidentate medially at the apical margin; basal two-thirds of clypeus finely rugose; first segment of flagellum four-fifths the length of the second; scape bicarinate beneath; antennal scrobes strongly carinate above; front rugoso-punctate; vertex sparsely, irregularly punctate; relative widths of head and thorax 6–8.

Thorax black, clothed with moderately dense, long, black, erect, and semierect black hairs; pronotum, mesonotum, and scutellum with dense, confluent punctures, appearing rugoso-punctate; dorsum and posterior face of the propodeum coarsely reticulate; basal third of the tegulae punctate, apical two-thirds smooth and shining; propleura with a distinct carina at the cephalic margin; anterior third of mesopleura with separated distinct punctures, the remainder rugoso-punctate; metapleura rugoso-punctate on the basal third, the remainder smooth and shining; propleura, mesopleura, and metapleura with sparse, erect, black hairs; anterior third of sides of propodeum shining, with a few large punctures, posterior two-thirds coarsely reticulate.

Abdomen black, with red pubescence; first tergite moderately long, rugoso-punctate throughout, with moderately dense, long, black, erect hairs; second tergite with small, dense, confluent punctures laterally, and small, separated punctures medially; sculpture of remaining tergites obscured by the dense pubescence; anterior third of second tergite with dense, long, erect, black hairs; posterior two-thirds of tergite two, and tergites 3–8 clothed with dense, long, orange-red, erect hairs; first sternite with a median longitudinal carina terminating in a distinct tooth at a point two-thirds the distance from the anterior to the posterior margins of the sternite; second sternite with a large, median pit. densely filled with hairs, closely, irregularly punctate at the sides, and with scattered punctures medially; sternites 2–5 with a dense fringe of long, red hairs at the apical margins.

Legs black, thickly clothed with long, black hairs.

Wings very dark fuscous.

Allotype.—Male, Tucson, Arizona (F. H. Snow), in entomological collection of University of Minnesota.

Distribution.—Arizona, California, Nevada, New Mexico, and Sonora, Mexico.

PARATYPE MATERIAL

ARIZONA: 3 males, Dragoon, Cochise County, July 20, 1917; 2 females, Carr Canyon, Huachuca Mountains, Cochise County, August, 1905 (H. Skinner); female, Benson, July 21, 1917; 4 females and male, Sabino Basin, St. Catalina Mountains, July 8–20, 1916; female, Sabino Basin, St. Catalina Mountains, September 24 (C. H. T. Townsend); female, Sabino, August 17, 1921; male, Catalina Mountains, June 11, 1924 (A. A. Nichol); 2 males, Santa Catalina Mountains, September 25, 1924 (A. A. Nichol); female, Tucson, March 22, 1921; female, Tucson, April; female, Santa Rita Mountains, July 16, 1921; female, McCleary's Camp, August 12, 1919; male, Bonita, July 18, 1917 (H. H. Knight); female, Bonita, July 19, 1917; female, Pima county, July 26, 1918; 3 females and one male, Baboquivari Mountains (F. H. Snow); male, Congress Junction, July (F. H. Snow); female, Jerome, June 23, 1900 (Oslar); 2 females, Hot Springs (Barber and Schwarz); 2 females, Texas Pass, July 20, 1917; female and 3 males, Yuma County, September, 1903; female, Coyote Mountains, August 4–7, 1916; female, Tinajas Alt, 1905 (W J McGee); female, Palo Alto, July 29–30, 1916; female, Wenden, August 10, 1919 (J. B. Swift); female, Ventana Canyon, August 7, 1919; female.

CALIFORNIA: Female, Riverside, July 31, 1908; male, Riverside, August 3, 1893; female, Claremont (Baker); male, Redlands; male, Ontario, August 9 (Snodgrass); female, San Diego County.

MEXICO: Female, Arizpe, Sonora, 1902; female and male, Copete mine, east of Carbo, Sonora (F. C. Nicholas).

NEW MEXICO: 2 males, Steins, July 14, 1917 (H. H. Knight); 2 males, Steins, July 14, 1917.

NEVADA: Female, Nelson, August 8, 1908 (J. F. Duncan).

Paratypes in collections of United States National Museum, American Museum of Natural History; American Entomological Society of Philadelphia, University of Minnesota, Cornell University, University of Kansas, Leland Stanford Jr. University, University of Arizona, Utah Agricultural College, Colorado Agricultural College, Mississippi Agricultural and Mechanical College, California State Insectary, J. Bequaert, H. H. Knight, and the author.

This species is, in superficial appearance, almost a duplicate of *klugii*, with its black head and thorax and orange-red abdomen. The female is readily distinguished from *klugii* by the prominent carina on the genae, the rugose pygidium, the fringe of reddish hairs on the apical margins of the ventral segments, and the dark-red color of the integument. The male is distinguished from *klugii* by the fringe of reddish hairs on the apical margins of the ventral segments (in *klugii* only the lateral apical margins have a fringe of reddish hairs), and by the structure of the genitalia; in the latter the base of the squamae beneath in *klugii* is thickly clothed with long hair, while in *magnifica* the hairs at the base of the squamae are sparse. The female of *magnifica* has been confused with *klugii* in collections, while the male has been designated as *phaon* in some instances. I have examined the type of the latter and find it may be distinguished from *magnifica* by the absence of a pit filled with hairs on the second sternite. The females vary in size from 17 to 23 mm., the males from 14 to 21 mm.

96. DASYMUTILLA SACKENII (Cresson)

Plate 3, fig. 20.

Mutilla sackenii CRESSON, Proc. Ent. Soc. Phila., vol. 4, p. 385, 1865, female.—DALLE TORRE, Cat. Hymen., vol. 8, p. 83, 1897, female, male.—FOX, Trans. Amer. Ent. Soc., vol. 25, p. 237, 1899, female, male.—MELANDER, Trans. Amer. Ent. Soc., vol. 29, p. 296, 1903, female, pl. 4, fig. 8.

Mutilla (Sphaerophthalma) sackenii BLAKE, Trans. Amer. Ent. Soc., vol. 3, p. 235, 1871, female.

Mutilla erudita CRESSON, Trans. Amer. Ent. Soc., vol. 5, p. 120, 1875, female.—DALLE TORRE, Cat. Hymen., vol. 8, p. 35, 1897, female.

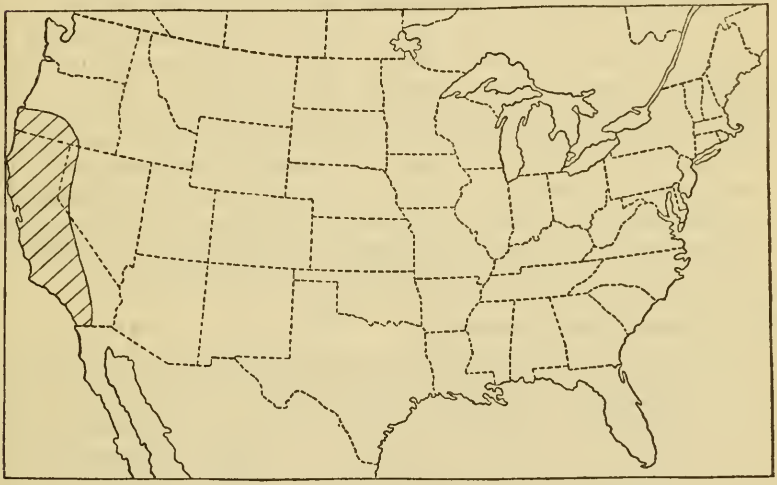

FIG. 24.—DISTRIBUTION OF DASYMUTILLA SACKENII (CRESSON)

Sphaerophthalma sackenii BLAKE, Trans. Amer. Ent. Soc., vol. 13, p. 213, 1886, female, male.

Sphaerophthalma erudita BLAKE, Trans. Amer. Ent. Soc., vol. 13, p. 217, 1886, female.

Ephuta (Ephuta) sackenii ANDRÉ, Gen. Ins., vol. 1, fasc. 11, p. 63, 1903, female.

Type.—Female, California, in collection of the American Entomological Society of Philadelphia. The type of *erudita* is in the collection of the American Entomological Society of Philadelphia.

Plesiotype.—Male, La Jolla, San Diego County, California, August 28, 1917 (H. Klotz), entomological collection of University of Minnesota.

Distribution.—California, Nevada, and Oregon. (Fig. 24.)

SPECIMENS EXAMINED

California: Female, male, Ocean Beach, August 3, 1921 (Knaus, Nininger, Hoover); female, Coahuila, San Diego County, August 18, 1914 (J. C. Bradley); female, San Diego, July, 1918; male, La Jolla, San Diego County, August 28, 1917 (H. Klotz); female, Laguna Beach, July 24, 1921; female, Laguna Bay, August 1, 1915; female, Newport, August 6, 1921; male, Newport Beach, Orange County, July 11, 1917 (E. Chandler); 2 females, Redondo Beach, June 17 (Dyar and Caudell); 2 females, Claremont (Essig); 2 females, male, Claremont (Baker); female, Claremont; 3 females, Mountains near Claremont (Baker); female, Redlands, July 3, 1918; female, Redlands; female, Fish Creek, San Bernardino Mountains, July 5, 1906 (J. Grinnell); female, San Bernardino; 2 females, San Bernardino Mountains; female, Simi, August 9, 1916 (C. Stoerkca); female, Pasadena, May 20, 1907 (F. Grinnell, Jr.); female, male, Pasadena (F. Grinnell, Jr.); male, Pasadena, July 28, 1898; female, Pasadena; 2 females, Sespe River, Fillmore, August 5, 1915 (C. H. Kennedy); female, Fillmore, November 2, 1915; female, Mount Wilson, September 14, 1908 (J. C. Bradley); female, Moorpark, April 15, 1916; female, Tejunga, June 25–28, 1918 (C. B. Philip); female, Lompoc, September 9, 1908 (J. C. Bradley); female, Delano, June 21 (H. M. Jeancon); female, Sequoia National Park; female, Lindsay, October 3, 1911 (C. E. Pemberton); female, Lindsay (C. E. Pemberton); female, Fresno County; female, Paraiso Springs, June 3, 1923 (L. S. Slevin); female, Carmel, Monterey County, September 12, 1919 (L. S. Slevin); female, Pacific Grove (Saunders); female, Monterey County, September 23, 1922 (R. T. Hatt); female, Pleasanton; male, Point Reyes, September 10, 1906; female, Mendocino; female, Lassen County, September, 1918; 11 females, male.

Nevada: Female, Ormsby County, July (Baker).

Oregon: Female, Riddle, August.

This species has been recorded also from Arizona, but I have not seen any specimens from that state and the record may rest upon a misdetermination. Many specimens show a faint yellowish tinge in the pubescence, while all of those from northern California have a decided yellowish color rather than white. The specimen from Carmel is a deep yellow in color but is undoubtedly this species. Cresson's *erudita* is a yellowish specimen of *sackenii.* Inasmuch as this color character does not seem to be constant but varies considerably in degree I have retained *erudita* as a synonym of *sackenii.*

The male has the following characters in addition to those given in the original description: anterior margin of the pronotum emarginate, the face of the emargination glabrous; tegulae glabrous, except for a few scattered punctures at the basal and inner lateral margins; apical tergite longitudinally ridged medially, shining, slightly rugose, without an apical fringe of hairs; second abdominal sternite with a median pit, closely packed with erect hairs. The male is very similar to the male of *magna* but may be distinguished from the latter by the absence of the apical fringe of hairs on the pygidium.

97. DASYMUTILLA SATANAS, new species

Female.—Very dark mahogany red, clothed with very long, erect, pale ochraceous pubescence; length, 20 mm.

Head dark mahogany red, the front and vertex clothed with erect and recumbent, long, pale ochraceous pubescence; mandibles acuminate at the tip, unidentate within; clypeus bidentate medially on the apical margin, clothed with long, erect, dark hairs concealing the sculpture; scape clothed with long, coarse pale hairs; first segment of the flagellum very long, two and one-half times as long as its width at the apex, slightly longer than the second and third segments united; antennal scrobes distinctly carinate above; front and vertex with large, shallow, confluent punctures; the genae rounded posteriorly, with moderate, shallow, more or less confluent punctures, very sparsely clothed with pale pubescence; relative widths of head and thorax, 11–16.

Thorax very dark mahogany red; the dorsum with exceedingly deep and coarse punctures, clothed with erect and recumbent, long, pale ochraceous pubescence; the propleura with shallow, confluent, indistinct punctures, clothed with sparse, dark pubescence; anterior half of mesopleura indistinctly punctate, the posterior half coarsely and deeply punctured, clothed with dark sparse, recumbent pubescence, except a longitudinal median row of very long, erect black hairs; metapleura coarsely and deeply punctate ventrally, glabrous dorsally, sparsely clothed with recumbent, dark hairs; sides and posterior face of propodeum exceedingly deeply and foveately reticulate, except the median basal portion of the posterior face moderately punctate, and the reticulations on the sides of the propodeum becoming shallower anteriorly.

Abdomen dark mahogany red; first tergite glabrous, except for shallow punctures along the apical margin; apical margin of first tergite with a row of erect black hairs; second tergite with very large, deep punctures throughout, the punctures near the basal and lateral margins exceedingly coarse and deep, clothed throughout except the basal lateral margins with very long, erect and recumbent, pale ochraceous pubescence; tergites 3–5 with moderate, more or less confluent punctures, clothed with very long, erect, pale ochraceous pubescence; pygidium longitudinally rugose; median carina of first sternite forming a tooth at its posterior extremity; second sternite with large, shallow punctures, some of which are confluent, the disk clothed with very sparse, erect, dark hairs, the sides with pale hairs, and the apical margin with a thick fringe of long, pale ochraceous hairs; sternites 3–5 with moderate, close, confluent punctures, their apical margins with a thick fringe of long, pale ochraceous hairs.

Legs dark mahogany red, sparsely clothed with long black hairs.

Holotype.—Female, Bill Williams Fork, Arizona, August (F. H. Snow), in collection of University of Kansas.

Paratypes.—Seven females, Bill Williams Fork, Arizona, August (F. H. Snow); female, Tucson, Arizona, July 26, 1921; female, Florence, July 29, 1917; female, Sacaton, July 26, 1924 (J. A. Harris, jr.); 2 females, Sacaton, July 27, 1924 (J. A. Harris, jr.); female, Yuma, Arizona, 1901 (H. Brown); female, Arizona; female, Indio, Salton depression, Riverside County, California, July 29, 1907; female, Ash Meadow, Nye County, Nevada, August 14–19, 1921 (Knaus, Nininger, Hoover). Paratypes in collections of United States National Museum, American Entomological Society of Philadelphia, University of Minnesota, University of Kansas, University of Arizona, Cornell University, and the author.

Satanas is related to *magna*, *magnifica*, *klugii*, and *sackenii.* It may be distinguished from the first three by the less coarsely sculptured genae, and from *sackenii* by the black pubescence in the apical fringes of the sternites.

98. DASYMUTILLA FLAMMIFERA, new species

Female.—Very dark mahogany red, the pubescence of the head, thorax, and abdomen above scarlet; length, 13 mm.

Head very dark mahogany red, the front and vertex clothed with long, erect and recumbent scarlet pubescence; mandibles acuminate at the tip, unidentate within; clypeus feebly bidentate medially on the apical margin, clothed with long, erect black hairs; scape clothed with coarse black hair; first segment of flagellum twice as long as its own width at the apex; antennal scrobes distinctly carinate above; front and vertex with moderate, close, shallow, confluent punctures; genae rounded posteriorly, with moderate, more or less confluent punctures, not as coarsely sculptured as the front and vertex, clothed with sparse black pubescence; relative widths of head and thorax, 8–9.

Thorax very dark mahogany red, the dorsum with coarse, deep, confluent punctures, clothed with long, erect and recumbent scarlet pubescence, longer than broad; propleura with scattered moderate punctures, the carina defining the cephalic margin very distinct, clothed with sparse black pubescence; anterior half of mesopleura glabrous, with small, indistinct punctures, clothed with sparse, recumbent black pubescence; posterior half of mesopleura closely and coarsely punctate with a longitudinal row of very long, erect, black hairs; metapleura glabrous with a few coarse punctures ventrally, clothed with sparse, recumbent, black pubescence; anterior half of sides of propodeum with scattered, moderate punctures, the posterior half becoming shallowly and broadly foveolate, the whole clothed with sparse black pubescence; posterior face of propodeum deeply, broadly foveolate, the ventral half clothed with sparse black pubescence, and not so coarsely sculptured as the dorsal half; the dorsal half of the posterior face of propodeum and the dorsum of the propodeum clothed with long, erect, scarlet pubescence.

Abdomen very dark mahogany red; first tergite glabrous except for a few coarse punctures at the sides and small, confluent punctures at the apical margin, with a subapical transverse row of very long, erect, black hairs, and an apical fringe of black pubescence; second tergite with large, more or less confluent punctures throughout, those at the basal lateral angles larger and coarser, clothed with thick, long, erect and recumbent, scarlet pubescence, except the basal lateral angles with sparse, black pubescence; tergites 3–5 with small, close punctures, clothed with long, erect, scarlet pubescence; pygidium longitudinally rugose on the basal three-fourths, granulate on the apical fourth; median carina of first sternite present but not dentiform; second sternite with large, separated punctures, very sparsely clothed with erect, black pubescence, and an apical fringe of black pubescence, the latter with a few scarlet hairs laterally; sternites 3–5 with moderate, close punctures, each sternite with an apical fringe of black pubescence, the fringe with a few scarlet hairs laterally.

Legs very dark mahogany red; clothed with long, black hairs.

Holotype.—Female, mountains near Claremont, California (Baker), in collection of Cornell University, No. 762.1.

Paratypes.—Four females, Claremont, California (Baker); 4 females, mountains near Claremont, California (Baker); female, Claremont, California (Essig); 2 females, Tejunga, June 25–28, 1918 (C. B. Philip); 2 females, Delano, June, 1921 (H. M. Jeancon); female, Los Gatos Canyon divide to mouth Mount Diablo range, Fresno County, June 6–8, 1907 (J. C. Bradley); female, Paraiso Springs, June 1, 1923 (L. S. Slevin); female, Mount Hamilton, August, 1923; 2 females, Las Urias Creek, Santa Cruz Mountains, Santa Clara County, California, August, 1908; female, Hanford, California, July 22, 1890 (J. G. Gilstrap); female, Phoenix, Arizona; 2 females, Ontario, Oregon, August 17, 1905 (Mallett); female, Boise City, Idaho. Paraytpes in collections of United States National Museum, American Entomological Society of Philadelphia, University of Minnesota, Cornell University, University of Nebraska, Oregon Agricultural College, California State Insectary, and the author.

This species is very much like *sackenii* (Cresson), but differs from that species in the sculpture of the genae, the color of the pubescence (although the yellow specimens of *sackenii* are practically the same color as the brown ocher ones of this species), and the character of the pubescence on the femora beneath. While most of the paratypes have the color of the pubescence scarlet like the type, the two from Oregon, the one from Idaho, and one from Claremont, California, have the pubescence brown ocher in color. The length of the specimens at hand varies from 10 to 16 mm. *Flammifera* is a manuscript name of Dr. J. C. Bradley.

99. DASYMUTILLA GLORIOSA (Saussure)

Mutilla gloriosa Saussure, Ann. Soc. Ent. Fr., ser. 4, vol. 7, p. 359, pl. 8, fig. 9, 9*a*, 1867, female.—Lucas, Ann. Soc. Ent. Fr., ser. 4, vol. 7, Bull. 92, 93, 1867, female.—Dalle Torre, Cat. Hymen., vol. 8, p. 44, 1897.—Fox, Trans. Amer. Ent. Soc., vol. 25, p. 237, 1899, female.—Melander, Trans. Amer. Ent. Soc., vol. 29, p. 296, pl. 4, figs. 5 and 45, 1903.

Mutilla tecta Cresson, Trans. Amer. Ent. Soc., vol. 5, p. 119, 1875, female.

Sphaerophthalma tecta Blake, Trans. Amer. Ent. Soc., vol. 13, p. 237, 1886, female.

Sphaerophthalma gloriosa Cameron, Biol. Centr. Amer., Hymen., vol. 2, p. 359, 1894, female.—Fox, Proc. Calif. Acad. Sci., ser. 2, vol. 5, p. 261, 1895.

Ephuta (*Ephuta*) *gloriosa* André, Gen. Ins., vol. 1, fasc. 11, p. 60, 1903, female.

Type locality.—Lower California; type probably in Paris Museum; type of *tecta* in collection of American Entomological Society of Philadelphia.

Distribution.—Lower California, California, Arizona, Nevada, Utah, Texas, and Mexico.

SPECIMENS EXAMINED

Arizona: Female, Nogales, July 10, 1903 (Oslar); female, Nogales, August 14, 1906; female, Catalina Mountains, June 13, 1903 (Oslar); female, Santa Catalina Mountains, July 15, 1924 (A. A. Nichol); female, Fort Grant, Pinaleno Mountains, July 15, 1917; female, Tucson, June 21, 1924 (A. A. Nichol); female, Tucson, July 1, 1920 (C. T. Vorhies); female, Tucson, August 5, 1906 (G. v. K.); female, Tucson, August 14–17, 1916; female, Tucson (J. J. Thomber); female, Morales, August 27, 1913 (A. W. Morrill); 2 females, Black Dike Prospect, Sierritas, July 26–29, 1916; female, Santa Rita Mountains, June (F. H. Snow); female, Santa Rita Mountains, July 16, 1921 (C. T. Vorhies); 2 females, Santa Rita Mountains, July (F. H. Snow); female, Santa Rita Mountains, July 21, 1921; 2 females, Baboquivaria Mountains (F. H. Snow); female, near Kits Peak, Baboquivari Mountains, August 7–9, 1916; female, Comobabi Mountains, August 9–10, 1916; 4 females, Coyote Mountains, August 4–7, 1916; female, Riverside; female, Florence, June 2, 1903; female, Florence, July 13, 1903 (C. R. Biederman); 2 females, Florence, October 9, 1903 (C. R. Biederman); female, Phoenix, July 16–18 (Wickham); female, Phoenix, August 3, 1917; 19 females, Phoenix, August 4, 1917; female, Phoenix, October 7; female, Phoenix, October 9 (Cockerell); female, Phoenix, Experiment Sta tion Farm, November 4 (Cockerell); female, Sacaton, July 25, 1924 (J. A Harris, jr.); 4 females, Sacaton, July 27, 1924 (J. A. Harris, jr); female, Sacaton, July, 1924 (J. A. Harris, jr.); 6 females, Sacaton, August 7, 1924

(J. A. Harris, jr.); 2 females, Sacaton (C. N. Ainslie); female, Buckeye (Cockerell); female, Jerome, June 24, 1902 (Oslar); female, Congress Junction, July (F. H. Snow); 3 females, Bill Williams Fork, August (F. H. Snow); female, Yuma, May 4, 1918 (J. C. Bradley); female, Yuma, 1905 (H. Brown); female, Ventana Can., August 7, 1919; 2 females, Patagonia Mountains, May 15, 1903 (Oslar); female, Texas Pass, July 19, 1917; 4 females.

CALIFORNIA: Female, Barstow, August 7, 1919 (Rehn and Hebard).

LOWER CALIFORNIA: 21 females, between San Jose del Cabo and Triunfo, 1911 (Albatross expedition); female, Triunfo, July 10, 1919 (Ferris).

MEXICO: Female, Hermosillo, Sonora, September 1, 1908.

NEVADA: Female, Nelson, July 5, 1907; female, Beatty, August 9–12, 1919 (Rehn and Hebard).

TEXAS: 3 females, Chisos Mountains, Brewster County, June 10–12, 1908 (Mitchell and Cushman).

UTAH: 2 females, St. George, July (Wickham); female, Sand dunes, July 13, 1923 (J. A. Harris, jr.); 2 females, Logan.

100. DASYMUTILLA PSEUDOPAPPUS (Cockerell)

Sphaerophthalma gloriosa SAUSSURE, var. *pseudopappus* COCKERELL, Psyche, vol. 7, suppl., p. 6, 1895, female.

Ephuta gloriosa pseudopappus COCKERELL, Proc. Dav. Acad. Nat. Sci., vol. 7, p. 140, 1898, female.

Mutilla pseudopappus FOX, Trans. Amer. Ent. Soc., vol. 25, p. 237, 1899, female.—MELANDER, Trans. Amer. Ent. Soc., vol. 29, p. 296, 1903, female, pl. 4, figs. 6 and 44.

Ephuta (*Ephuta*) *gloriosa* SAUSSURE, var. *pseudopappus* ANDRÉ, Gen. Ins., vol. 1, fasc. 11, p. 60, 1903, female.

Type.—Female, Las Cruces, New Mexico, in United States National Museum.

Distribution.—Colorado, New Mexico, Arizona.

SPECIMENS EXAMINED

ARIZONA: Female, Tucson, May 17, 1924 (A. A. Nichol).

COLORADO: Female, Cedar, October 17, 1901 (I. W. Stevens).

NEW MEXICO: Female, Las Cruces, June 6 (Cockerell); female, Las Cruces, June 18 (Cockerell); female, Las Cruces, June 23; female, Las Cruces, September 17 (Cockerell); female, Mesilla Valley, 1896 (Elgin Holt); female, Mesilla, June (H. Casad and J. F. Bennett); female, Mesilla Park, June (Cockerell); female, Black Range, Sierra County, 1915 (H. A. Pilsbry); female, Jemez Springs, July 24, 1916 (John Woodgate); female, Jemez Springs, September 24, 1916 (John Woodgate); female, Jemez Springs (John Woodgate); female.

TEXAS: Female, Phantom Lake, Fort Davis Quad, June 9, 1916 (F. M. Gaige); 3 females, Phantom Lake, Fort Davis Quad, June 12, 1916 (F. M. Gaige); female, Cherry Canyon, Fort Davis Quad, June 28, 1916 (F. M. Gaige).

I have examined the cotype of this species in the United States National Museum and find that it is unquestionably of specific rank; it differs from *gloriosa* in the following characters, most of which were not mentioned in the original description; carina between the antennal tubercles and the margins of the eyes very prominent (in most specimens of *gloriosa* this carina is almost obsolete); genae posteriorly bounded by an obscure carina (in *gloriosa* the genae are distinctly rounded posteriorly); thorax with only an inconspicuous scutellar scale and no carina anterior to it (in *gloriosa* the thorax with an irregular transverse carina just anterior of the scutellar scale, the latter broad and prominent); second abdominal tergite very coarsely and deeply punctate (in *gloriosa* moderately and shallowly punctate); pygidium very prominently longitudinally striate (in *gloriosa* irregularly rugose); body and legs blackish (in *gloriosa* red).

101. DASYMUTILLA SCITULA, new species

Plate 3, fig. 25

Male.—Black; vertex, thorax above and disk of second abdominal tergite with long, erect, yellow pubescence, abdomen from apex of segment two with black pubescence. Length, 13 mm.

Head black; mandibles acute at the apex, bidentate within near the tip; clypeus bidentate medially at the apical margin, closely and finely punctate, clothed with long, erect, black pubescence; scape punctured, clothed with sparse, erect, black pubescence; first segment of flagellum distinctly shorter than the second; antennal scrobes distinctly carinate above; front with close, shallow, more or less confluent punctures, clothed with long, rather dense, erect, black pubescence; the vertex similarly punctured but the pubescence mostly yellow; genae with close, shallow more or less confluent punctures, clothed with long, erect, black pubescence; relative widths of head and thorax, 7–10.

Thorax black; anterior margin of prothorax broadly and shallowly emarginate medially, the cephalic surface of the emargination glabrous, impunctate; pronotum, mesonotum and scutellum and metanotum closely, more or less confluently, and shallowly punctured, clothed with long, dense, erect, yellow pubescence; propleura with large, very shallow, more or less confluent punctures; mesopleura with large, shallow punctures, those of the anterior half separated, those of the posterior half more or less confluent, clothed with sparse, erect black pubescence; metapleura glabrous, impunctate on the dorsal half, closely, shallowly punctate on the ventral half, clothed with sparse, erect, black pubescence; sides, dorsum, and posterior face of propodeum broadly and deeply reticulate, clothed with long, erect black pubescence; tegulae blackish, glabrous, the basal and lateral margins closely punctate, clothed with long, yellow pubescence.

Abdomen black; first segment subnodose; first tergite closely and confluently punctured, the punctures smaller and closer on the apical third, clothed with long, erect, black pubescence; the second tergite closely and confluently punctured throughout, the basal and lateral margins clothed with long, erect, black pubescence, the apical fringe also black, remainder of tergite clothed with long, dense, erect, yellow pubescence; tergites 3–6 very closely and confluently punctured, clothed with long, dense, erect, black pubescence; basal margin of apical tergite clothed with black pubescence, remainder of tergite bare, rugose, the apical margin reflexed; first sternite keeled beneath, the keel prolonged posteriorly into a prominent blunt tooth; sparsely clothed with long, black, erect pubescence; second sternite with separated, elongate, shallow punctures, and a median pit densely filled with fine pubescence, the apical margin of the sternite depressed; sternites 3–6 closely, confluently punctured; sternites 2–6 sparsely clothed with long, erect, black pubescence, and each with a dense, apical fringe of long, black pubescence.

Legs black, clothed with long, black pubescence.

Wings dark fuliginous; cell R_4 almost obsolete.

Female.—Black; vertex, thorax above, and disk of second abdominal tergite with long, dense, yellow pubescence. Length, 15 mm.

Head black; mandibles acute at the apex, unidentate within at about one-third their length from the apex; clypeal fringe dense, of long, black pubsecence; scape punctured, clothed with coarse, black hairs; first segment of flagellum twice as long as its own width at the apex; antennal scrobes distinctly carinate above; front and vertex with dense confluent punctures, the front clothed with long, erect and recumbent, black pubescence, the vertex with long, erect and recumbent yellow pubescence; genae with shallow, more or less confluent punctures, not as coarsely sculptured as the front and vertex, sparsely clothed with long, erect, black pubescence; relative widths of head and thorax, 9–10.5.

Thorax black; dorsum with large, deep, confluent punctures, almost reticulate, clothed with long, dense, erect and recumbent, yellow pubescence; propleura with large, close, shallow punctures, sparsely clothed with long, black pubescence; anterior half of mesopleura with small, separated, shallow, indistinct punctures, clothed with long, black pubescence; posterior half of mesopleura coarsely confluently punctured anteriorly, impunctate near the posterior margin, clothed with long, erect black pubescence; metapleura impunctate dorsally, subglabrous, ventrally with large, shallow, separated punctures, clothed with long, black pubescence; anterior margin of sides of propodeum with indistinct, shallow, separated punctures, the posterior half shallowly, indistinctly reticulate; posterior face of the propodeum deeply and coarsely reticulate, especially dorsally and laterally; dorsum of propodeum deeply coarsely reticulate; the dorsum, and dorsal third of posterior face of propodeum with long, erect, yellow pubescence like that of the dorsum of the thorax, remainder of propodeum with long, erect, black pubescence; scutellar scale present and prominent.

Abdomen black; first segment short, subsessile; first tergite with scattered, shallow, indistinct punctures on the disk, small, close, confluent punctures on the apical margin, sparsely clothed with long, erect, black pubescence; second tergite with shallow, more or less confluent punctures throughout, those on the lateral portions larger, and somewhat elongate; very broad lateral margins and apical margin clothed with long, erect, black pubescence, the apical fringe also of long, black pubescence, the remainder of the tergite clothed with long, erect and recumbent, yellow pubescence; tergites 3–5 with small, more or less confluent, indistinct punctures, densely clothed with long, erect, black pubescence; pygidial area irregularly rugose; first sternite with a short median keel anteriorly; second sternite with rather close, shallow, elongate punctures throughout, the apical margin somewhat depressed; sternites 3–5 closely, confluently punctate; sternites 2–5 sparsely clothed with long, erect, black pubescence, and each with a dense apical fringe of black pubescence.

Legs black, clothed with long, black pubescence.

Holotype.—Male, Trout Creek, Juab County, Utah, July 4, 1922 (Tom Spalding), in collection of University of Minnesota.

Allotype.—Female, Trout Creek, Juab County, Utah, July 4, 1922 (Tom Spalding), in collection of University of Minnesota.

Paratypes.—Six males, 3 females, Trout Creek, Juab County, Utah, July 4, 1922 (Tom Spalding); male, Trout Creek, Juab County, Utah, July 9, 1922 (Tom Spalding); 2 females, Trout Creek, Juab County, Utah, July 11, 1922 (Tom Spalding); female, Trout Creek, Ibapah Mountains, August 4, 1922 (Tom Spalding); female, Trout Creek, Ibapah Mountains, August 11, 1922 (Tom Spalding); 2 males, Wildcat Valley, Beaver County, Utah; female, South Creek, Beaver County, Utah; female, Sevier County, Utah. Paratypes in collections of University of Minnesota, J. Bequaert, and the author.

This species is at once recognizable by the beautiful yellow pubescence and the black apical segments of the abdomen. The males and females are almost identical in superficial appearance, disregarding of course the absence of wings in the female. The males vary in length from 10.5 to 16 mm., while the females vary from 8 to 17 mm.

102. DASYMUTILLA SICHELIANA (Saussure)

Mutilla sicheliana Saussure, Ann. Soc. Ent. France, ser. 4, vol. 7, p. 360, 1867, female.—Blake, Trans. Amer. Ent. Soc., vol. 3, p. 257, 1871, female.—Dalle Torre, Cat. Hymen., vol. 8, p. 85, 1897, female.—Fox, Trans. Amer. Ent. Soc., vol. 25, p. 238, 1899, female.

Sphaerophthalma sicheliana Blake, Trans. Amer. Ent. Soc., vol. 13, p. 217, 1886, female.—Cameron, Biol. Centr.-Amer., Hymen., vol. 2, p. 354, 1895, female.

Sphaerophthalma prunotincta Cockerell, Ent. News, vol. 6, p. 60, 1895, female.—Cameron, Biol. Centr.-Amer., Hymen., vol. 2, p. 359, 1895, female.

Mutilla prunotincta Dalle Torre, Cat. Hymen., vol. 8, p. 74, 1897, female.

Mutilla (Ephuta) sicheliana André, Ann. Soc. Ent. France, vol. 67, p. 56, 1898, female.

Ephuta (Ephuta) sicheliana André, Gen. Ins., vol. 1, fasc. 11, p. 63, 1903, female.

Type.—Female, Mexico; probably in the Paris Museum; location of type of *prunotincta* not known.

Distribution.—Arizona, Mexico.

SPECIMENS EXAMINED

Arizona: Female, Fort Grant, Pinaleno Mountains, July 14, 1917; female, Fort Grant, Pinaleno Mountains, July 15–19, 1917; 2 females, Fort Grant, Graham Mountains; female, San Bernardino Ranch, Cochise County, August (F. H. Snow); female, Nogales, July 17, 1903 (Oslar); 2 females, Sabino Basin, St. Catalina Mountains, July 8–20, 1916; female, Sabino Basin, St. Catalina Mountains, August 15–21, 1916; female, Sabino Basin, St. Catalina Mountains, September 26 (C. H. T. Townsend); 2 females, Baboquivaria Mountains (F. H. Snow).

Mexico: 3 females.

According to André *prunotincta* Cockerell is a synonym of this species. The posterior margin of the genae in this species is bounded by a prominent carina, a character not mentioned in any previous description.

103. DASYMUTILLA GORGON (Blake)

Mutilla (Sphaerophthalma) gorgon Blake, Trans. Amer. Ent. Soc., vol. 3, p. 233, 1871, female.

Mutilla gorgon Blake, Trans. Amer. Ent. Soc., vol. 4, p. 71, 1872, female.—Dalle Torre, Cat. Hymen., vol. 8, p. 44, 1897, female.—Fox, Trans. Amer. Ent. Soc., vol. 25, pp. 248–249, 1899, female.—Melander, Trans. Amer. Ent. Soc., vol. 29, p. 302, 1903, female.

Mutilla tisiphone Blake, Trans. Amer. Ent. Soc., vol. 7, p. 249, 1879, female.—Dalle Torre, Cat. Hymen., vol. 8, p. 92, 1897. female.

Sphaerophthalma gorgon Blake, Trans. Amer. Ent. Soc., vol. 13, p. 210, 1886, female.

Sphaerophthalma tisiphone Blake, Trans. Amer. Ent. Soc., vol. 13, p. 210, 1886, female.

Ephuta gorgon Cockerell, Proc. Dav. Acad. Nat. Sci., vol. 7, p. 140, 1898.

Ephuta (Ephuta) gorgon André, Gen. Ins., vol. 1, fasc. 11, p. 60, 1903, female.

Type.—Female, Texas, in collection of American Entomological Society of Philadelphia; type of *tisiphone* in collection of American Entomological Society of Philadelphia.

Distribution.—Louisiana, Texas, Oklahoma, and New Mexico. (Fig. 25.)

SPECIMENS EXAMINED

LOUISIANA: Female, Columbus, June 26, 1902 (C. E. Hood).

NEW MEXICO: Female, Las Cruces (Walker); female, Mesilla Park, June 2 (Cockerell); female, Mesilla Park, July 18 (Cockerell); female, Mesilla Park, July (Cockerell); female, Mesilla, June (Cockerell); female, Mesilla, November 20 (Cockerell); female, Albuquerque, July 17, 1902 (Oslar); female, Albuquerque, July 19, 1902 (Oslar); female, Albuquerque (Oslar).

OKLAHOMA: Female, Ardmore, September 20, 1905 (F. C. Bishopp).

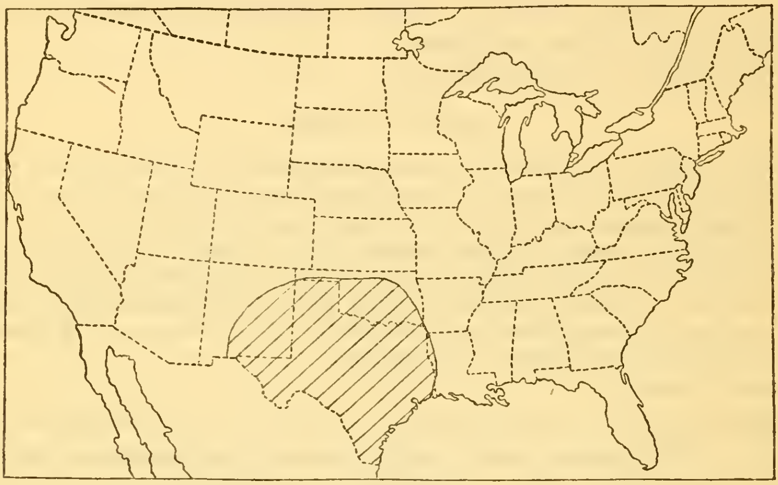

FIG. 25.—DISTRIBUTION OF DASYMUTILLA GORGON (BLAKE)

TEXAS: Female, Calvert, August 24, 1903 (A. W. Morrill); female, Calvert (G. H. Harris); female, Cotulla, May 11, 1906 (J. C. Crawford); 2 females, Cotulla, May 12, 1906 (J .C. Crawford); female, Austin; female, Burnet, June 2, 1906 (J. D. Mitchell); female, Eastland County, May 27, 1921 (Grace O. Wiley); female, Eastland County, May 30, 1921 (Grace O. Wiley); 2 females, Eastland County, May 31, 1921 (Grace O. Wiley); 5 females, Eastland County, June 4, 1921 (Grace O. Wiley); female, Eastland County, June 6, 1921 (Grace O. Wiley); female, Eastland County, June 8, 1921 (Grace O. Wiley); female, Eastland County, June 19, 1921 (Grace O. Wiley); female, Eastland County, July 17, 1921 (Grace O. Wiley); 2 females, Eastland County, August 8, 1920 (Grace O. Wiley); female, Eastland County, August 13, 1920 (Grace O. Wiley); female, Eastland County, August 28, 1920 (Grace O. Wiley); female, Eastland County, August 31, 1920 (Grace O. Wiley); female, Eastland County, August (Grace O. Wiley); 2 females, Eastland County, September 13, 1920 (Grace O. Wiley); female, Callahan County, May 13, 1921 (Grace O. Wiley); female, Fedor; 3 females, Del Rio, June 22–27 (Wickham); 2 females, Juno, July 3, 1917; 2 females, Sheffield, July 4, 1917; female, Marathon, June 7, 1908 (Mitchell and Cushman); female, Marfa, May 15, 1918 (J. C. Bradley); female, Phantom Lake, Fort Davis Quad, June 6, 1916 (F. M. Gaige); female, Cherry Canyon, Fort Davis Quad, June 28, 1916 (F. M. Gaige); female, Phantom Lake, Fort Davis Quad, July 14, 1916 (F. M. Gaige); female.

The variety described by Fox (1899) seems to be *leda* Blake. *Gorgon* is easily recognized by the head being wider than the thorax, antennal scrobes not carinate above, and the black head and thorax.

104. DASYMUTILLA LEDA (Blake)

Mutilla (*Sphaerophthalma*) *leda* BLAKE, Trans. Amer. Ent. Soc., vol. 4, p. 72, 1872, female.

Mutilla leda BLAKE, Trans. Amer. Ent. Soc., vol. 7, p. 244, 1879, female.—DALLE TORRE, Cat. Hymen., vol. 8, p. 53, 1897, female.—FOX, Trans. Amer. Ent. Soc., vol. 25, p. 238, 1899, female (part).

Sphaerophthalma leda BLAKE, Trans. Amer. Ent. Soc., vol. 13, p. 216, 1886, female.

Mutilla gorgon FOX, Trans. Amer. Ent. Soc., vol. 25, p. 248, 1899, female (only the variety).

Ephuta (*Ephuta*) *leda* ANDRÉ, Gen. Ins., vol. 1, fasc. 11, p. 61, 1903, female.

Mutilla prognoides VIERECK, Trans. Amer. Ent. Soc., vol. 32, p. 186, 1906, female.

Type.—Female, Dallas County, Texas, in collection of Museum of Comparative Zoölogy, Cambridge, Massachusetts. The type of *prognoides* is in the collection of the University of Kansas.

Distribution.—Texas, Oklahoma, Kansas, Colorado, Nebraska, and South Dakota. (Fig. 26.)

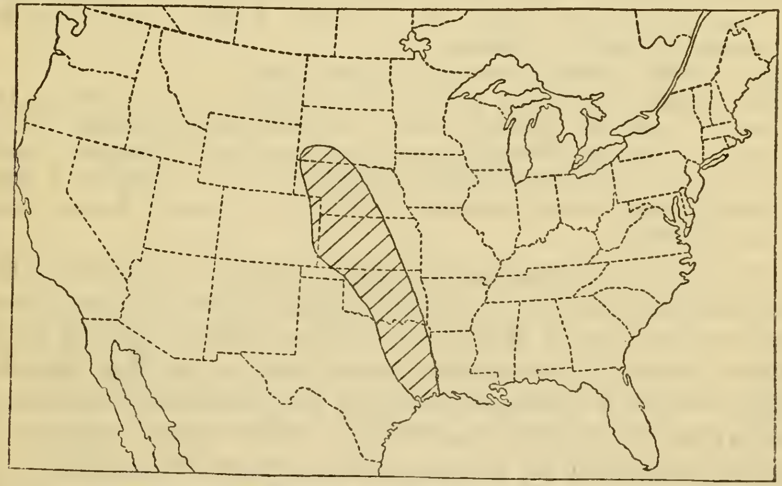

FIG. 26—DISTRIBUTION OF DASYMUTILLA LEDA (BLAKE)

SPECIMENS EXAMINED

COLORADO: Female, Holly, September 8, 1898.

KANSAS: Female, Medora (W. Knaus); 2 females, Russell County, July 26, 1912 (F. X. Williams); 3 females, Russell County, August 26, 1912 (F. X. Williams); female, Russell; 2 females, Comanche County, 1916 (R. H. Beamer); female, Kiowa County, July 6, 1911 (F. X. Williams); female, Osborne County, August 3, 1912 (F. X. Williams); 4 females, Rooks County, August 9, 1912 (F. X. Williams); female, Phillips County, August

30, 1912 (F. X. Williams); female, Norton County, August 23, 1912 (F. X. Williams); 3 females, Graham County, August 16, 1912 (F. X. Williams); 6 females, Clarke County, May (F. H. Snow); 10 females, Clark County, June (F. H. Snow); female, Meade County, June 27 (Lantz); 2 females, Meade County, July 10, 1911 (F. X. Williams); female, Meade County; female, Grainfield, September 23 (Lantz); 4 females, Seward County, August 16, 1911 (F. X. Williams); 2 females, Seward County, August 18, 1911 (F. X. Williams); 9 females, Grant County, July 23, 1911 (F. X. Williams); 3 females, Grant County, August 27, 1911 (F. X. Williams); 2 females, Logan County (F. X. Williams); 3 females, Morton County, June (F. H. Snow); 13 females, Morton County, August 5, 1911 (F. X. Williams); 4 females, Morton County (F. H. Snow); 9 females, Stanton County, July 30, 1911 (F. X. Williams); 2 females, Hamilton County, June, 1902 (F. H. Snow); 5 females, Hamilton County (F. H. Snow); 4 females, Greeley County (F. X. Williams); female, Wallace County, July 7; female, Wallace County, July 9; 4 females, Wallace County (F. H. Snow); 2 females (Snow).

NEBRASKA: Female, Halsey, August 9, 1912 (J. T. Zimmer); female, Halsey, August 13, 1920 (C. B. Philip); female, Halsey, August 16, 1925 (R W. Dawson); female, Halsey, August 24, 1911 (J. T. Zimmer); female, Sand Hills, July; female, Imperial, July 2, 1911 (J. T. Zimmer); female, Benkelman, June 1 (Lantz); 2 females, Benkelman, October 5 (Lantz); female, Haigler, August 10, 1901 (L. Bruner); 3 females, Haigler, August 10, 1901 (M. A. Carriker, jr.); female, Haigler, August 14, 1909 (C. H. Gable).

OKLAHOMA: Female, Payne County, June 21, 1925 (W. J. Brown); female, Payne County, July 5, 1925 (W. J. Brown); female, Payne County, September 12, 1923 (W. J. Brown).

SOUTH DAKOTA: 2 females, Hot Springs, July 7, 1924.

TEXAS: Female, Jacksonville, June 5, 1919 (Paddock); female, Athens, June 26, 1907 (W. W. Yothers); female, Palestine, August 23, 1907 (W. W. Yothers); female, College Station, July 6, 1918 (H. J. Reinhard); female, Calvert (G. H. Harris); female, Hempstead, June 16, 1907 (R. A. Cushman); female, Rosser, September 23, 1905 (C. R. Jones); female, Terrell, May 9, 1904.

This species is very closely related to *gorgon*, the principle difference being in the color of the pubescence of the head and thorax. *Leda* was described by Blake from a unique specimen taken in Dallas County, Texas. This specimen formed part of the Boll collection which was sent to Blake for study by the Museum of Comparative Zoölogy at Cambridge, Massachusetts. This unique specimen of *leda* was returned to the Museum of Comparative Zoölogy and is now in their collections. The specimens placed here are identical with this type. There is a specimen labeled " Texas " in the collection of the American Entomological Society of Philadelphia designated as the type of *leda*. This specimen is an example of *klugii* and neither answers to Blake's description of the species nor satisfies the requirements of the statement regarding the type locality. It can therefore not be considered as type material. I have also examined the type of *prognoides* Viereck and find it to be the same as *leda*. The variety of *gorgon* with the reddish pubescence on the head and thorax, described by Fox (1899), evidently belongs here.

105. DASYMUTILLA AUREOLA (Cresson)

Plate 4, fig. 28

Mutilla aureola Cresson, Proc. Ent. Soc. Phila., vol. 4, p. 386, 1865, female.—Blake, Trans. Amer. Ent. Soc., vol. 7, p. 244, 1879, female.—Dalle Torre, Cat. Hymen., vol. 8, p. 13, 1897, female.—Fox, Trans. Amer. Ent. Soc., vol. 25, p. 248, 1899, female, male.—Melander, Trans. Amer. Ent. Soc., vol. 29, p. 302, 1903.

Mutilla (Sphaerophthalma) aureola Blake, Trans. Amer. Ent. Soc., vol. 3, p. 235, 1871, female.

Sphaerophthalma parmosa Blake, Trans. Amer. Ent. Soc., vol. 13, p. 210, 1886, female.

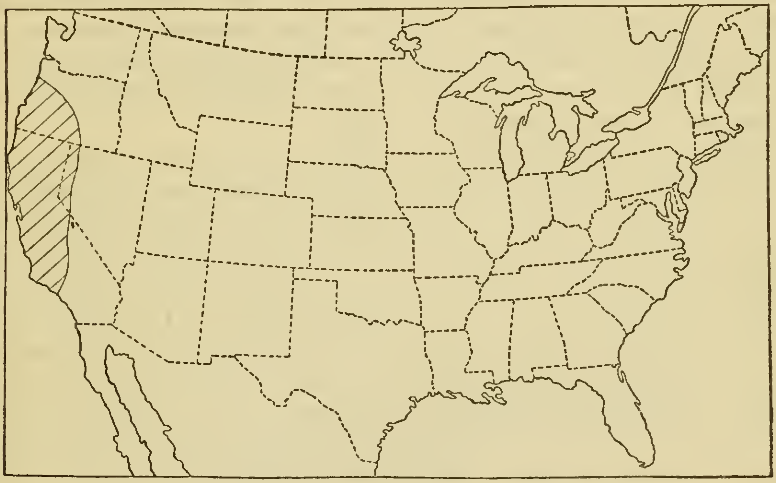

Fig. 27.—Distribution of Dasymutilla aureola (Cresson)

Sphaerophthalma aureola Blake, Trans. Amer. Ent. Soc., vol. 13, p. 215, 1886, female.

Sphaerophthalma mollissima Blake, Trans. Amer. Ent. Soc., vol. 13, p. 215, 1886, female, male.

Ephuta (Ephuta) aureola André, Gen. Ins., vol. 1, fasc. 11, p. 57, 1903, female.

Type.—Female, California, collection of American Entomological Society of Philadelphia. The types of *parmosa* and *mollissima* are in the collection of the American Entomological Society of Philadelphia.

Distribution.—California, Nevada, and Oregon. (Fig. 27.)

The description of the male is as follows:

Male.—Very dark mahogany red; length 10 mm.

Head very dark mahogany red; front and vertex clothed with long, erect, golden-yellow hairs, remainder of head clothed with sparse, long, erect black hairs; mandibles tridentate; clypeus punctate, and bidentate medially at the apical margin; the first and second segments of the flagellum approximately equal in length; scape punctate, obscurely bicarinate beneath; antennal scrobes strongly carinate above; front, vertex and genae with shallow, irregular, more or less confluent punctures; relative widths of head and thorax, 7–7.

Thorax very dark mahogany red; pronotum, mesonotum, and scutellum clothed with long, erect, golden-yellow hairs; remainder of thorax clothed with long, sparse, black hairs; pronotum, mesonotum and scutellum with large, close, more or less confluent punctures; tegulae testaceous, glabrous, with a fringe of long, yellow hairs at the basal and inner lateral margins; propleura with scattered, small, shallow punctures on the disk; mesopleura with large, more or less confluent punctures, the anterior third with the punctures well separated; metapleura glabrous, with irregular, scattered punctures on the ventral half; sides of propodeum with large, scattered punctures, becoming foveolate at the caudal margin; dorsal and posterior faces of the propodeum irregularly foveolate.

Abdomen dark mahogany red, clothed with golden yellow hairs; first segment short; first tergite coarsely punctured, clothed with very long, sparse, black hairs; second tergite coarsely, deeply and confluently punctured at the base and sides, but with small, well separated punctures on the disk and caudal margin, clothed with long, erect, black hairs on the anterior third, and with long, erect, golden yellow hairs on the posterior two-thirds; tergites 3–6 testaceous, with small, scattered punctures, and clothed with long, erect, golden yellow hairs; last tergite subtestaceous, irregularly rugose, the basal fourth clothed with long, erect, golden yellow hairs; first sternite with a prominent, median, longitudinal carina; second sternite irregularly punctured, the punctures shallow and scattered on the disk, deeper and closer at the margins, with a large, elliptical, median pit closely packed with erect bristles slightly cephalad of the center, the apical margin of the sternite with a thin fringe of golden yellow hairs; sternites 4–6 with small scattered punctures, each with a thin apical fringe of golden yellow hairs; last sternite irregularly punctate, sparsely clothed with erect, black hairs.

Legs dark mahogany red, sparsely clothed with long, black hairs.

Wings dark fuliginous; cell 2nd R_1+R_2 broadly truncate at the apex; cell R_4 indistinct; vein M_{3+4} received by cell R_5 at one-third the distance between the base and apex of the latter, veins r–m and R_5 approximate on vein r.

Allotype.—Stanford University, California, September, collection of University of Minnesota.

SPECIMENS EXAMINED

CALIFORNIA: Female, Santa Paula (Essig); male, Carmel, Monterey County, September 22, 1916; male, Carmel, Monterey County, September 12, 1919; 2 females, Stanford University, May, 1915; male, Stanford University, August 26, 1909; female, 4 males, Stanford University, September; male, Stanford University, October, 1905; female, Las Uras Creek, Santa Cruz Mountains, Santa Clara County, July, 1908; female, Berkeley, October 4, 1919; female, Mountain View, May, 1892 (Ehrhorn); male, Stevens Creek Canyon, near Mountain View, October, 1898 (Ehrhorn); 5 females, Cypress Ridge, Marin County, March 29, 1921 (C. T. Dodds); female, male, Marin County; female, Sonoma County, July, 1908; female, Yolo County, May 14, 1913; female, Auburn, April (L. Bruner); male, Auburn, October, 1918 (L. Bruner); female, Bair's Ranch, Redwood Creek, Humboldt County, June 12 (H. S. Barber); 2 females, Siskiyou County (A. Koebele); female, Siskiyou County; 2 males, Mount Shasta district; 3 females, male.

NEVADA: Female.

OREGON: Female, Klamath Falls, June 20 (W. J. Chamberlin); female, Odell, June 10, 1914 (H. F. Wilson); female, Corvallis, May 24, 1908 (Laura Hill); female, Corvallis, May 31, 1913 (Warner); female, Corvallis, July 20, 1925 (D. G. Gillespie).

The types of *aureola* (Cresson), *parmosa* (Blake) and *mollissima* (Blake) have been examined and the two latter found to be identical with this species. There is considerable variation in the color of the pubescence, ranging from a dark, golden yellow to a pale golden yellow, and also in size, the length varying from 9 to 11 mm. in the females, and 9 to 15 mm. in the males. The area of golden pubescence of the second tergite is distinctly emarginate medially on the anterior margin which together with the golden yellow color of the pubescence distinguish this form the variety *pacifica*. The males have a greater area of black pubescence at the base of the second tergite than males of the variety *pacifica*.

106. DASYMUTILLA AUREOLA var. PACIFICA (Cresson)

Mutilla pacifica CRESSON, Trans, Amer. Ent. Soc., vol. 5, p. 120, 1875, female.—BLAKE, Trans. Amer. Ent. Soc., vol. 7, p. 244, 1879. female.—DALLE TORRE, Cat. Hymen., vol. 8, p. 70, 1897, female.—FOX Trans. Amer. Ent. Soc., vol. 25, p. 248, 1899, female.—MELANDER, Trans. Amer. Ent. Soc., vol. 29, p. 302, 1903.

Sphaerophthalma pacifica BLAKE, Trans. Amer. Ent. Soc., vol. 13, p. 217, 1886, female.—VIERECK, Proc. Acad. Nat. Sci. Phila., vol. 54, p. 743, 1903, female, male.

Ephuta (*Ephuta*) *pacifica* ANDRÉ, Gen. Ins., vol. 1, fasc. 11, p. 62, 1903, female.

Type.—Female, California (H. Edwards; G. R. Crotch), collection of American Entomological Society of Philadelphia.

Distribution.—California and British Columbia.

SPECIMENS EXAMINED

BRITISH COLUMBIA: Female, Victoria, March 1, 1905.

CALIFORNIA: Male, San Diego, April 10, 1916 (L. A. Titus); male, La Jolla, San Diego County, July 17, 1917 (H. Klotz); female, La Jolla, August 6, 1914 (J. C. Bradley); male, La Jolla, San Diego County, August 24, 1917 (H. Klotz); female, La Jolla, San Diego County, August 25, 1917 (H. Klotz); male, La Jolla, San Diego County, August 27, 1917 (H. Klotz); male, La Jolla, San Diego County, August 28, 1917 (H. Klotz); male, La Jolla, San Diego County, August 29, 1917 (H. Klotz); male, La Jolla, August (Cockerell); female, Descanso, San Diego County, August 14, 1917; female, Laguna Beach, June 25, 1916; male, Laguna Beach, July 29, 1916; 2 females, Laguna Beach, July (Melville H. Hatch); male, Laguna Beach, September 16; female, Orange County; female, Redlands; female, Ontario, August 18 (Snodgrass); female, Claremont, April, 1900; female, Claremont, August 10, 1894; female, Palmer Canyon, Claremont, 1916 (Melville H. Hatch); female, Claremont (Essig); 16 females, 2 males, Claremont (Baker); 2 males, mountains near Claremont (Baker); 2 females, Claremont; female, Pasadena, June 6, 1895 (R. W. Doane); female, Pasadena, August 13 (O. B. Hayes); female, Los Angeles, March 15, 1914; female, Los Angeles, May 4, 1918; female, Los Angeles, June 4, 1917 (R. May); male, Los Angeles, August, 1916; female, Tejunga, Los Angeles County, March 30, 1918 (H. Klotz); female, Tejunga, Los Angeles County, April 15, 1917; female, Mill Creek Trail, Los Angeles County, March 31, 1918 (R. May); female, 2 males, Los Angeles County; female, San Gabriel Mountains, San Antonio Canyon, April 20, 1918; female, Santa Paula (Essig); 3 females, Santa Paula; female, Ventura County; female, Santa Barbara, July 23; female, Santa Barbara County, May; 2 females, San Luis Obispo, April 10 (Noren); female, Argus Mountains, May, 1891; female, Delano, June 21 (H. M. Jeancon); female, Jolon, April 25, 1917 (L. S. Slevin); 3 females, Paraiso Springs, Monterey County, May 6, 1922 (L. S. Slevin); female, Paraiso Springs, Monterey County, May 8, 1922 (L. S. Slevin); female, Paraiso Springs, May 30, 1923 (L. S. Slevin); female, Paraiso Springs, June 1, 1923 (L. S. Slevin); female, Paraiso Springs, June 2, 1923 (L. S. Slevin); female, Carmel, Monterey County, June 3, 1917; female, Santa Clara County; female, Berkeley, Jan. 31, 1920; female, Berkeley, March 12, 1915 (E. P. Van Duzee); female, Berkeley, September 9, 1919; female, Berkeley, September 23, 1915 (E. P. Van Duzee); male, Berkeley, October 4, 1919; female, Berkeley, November 11, 1919; female, Berkeley, December 14, 1919; female, Berkeley; female, Yosemite Valley, June 13, 1907; female, Morgan Hill, June 1, 1922; 6 females.

This can only be considered as a variety of *aureola.* There are no structural characters in either sex by which the two forms can be separated. The great majority of the specimens of *pacifica* have the pubescence scarlet although the pubescence of several specimens is golden yellow. A specimen from the Argus Mountains, California, has the pubescence whitish but is unquestionably this species. In these latter the anterior margin of the golden pubescence of the second tergite is not emarginate medially as in *aureola.* In all the specimens placed here as *pacifica* there is only a very narrow area of black pubescence at the base of the second tergite, while in *aureola* almost the basal third of the second tergite is clothed with black pubescence. The genitalia of the males are identical with those of *aureola*. There is a very great variation in size among the females, the lengths varying from 7 to 16 mm., while in the males the length varies from 9 to 12 mm. Cresson's type has been examined and is identical with specimens recorded here. The distribution of this variety seems to be more southern than is the case with *aureola*, although there is a specimen, undoubtedly variety *pacifica*, from Victoria, British Columbia, and a specimen of *aureola* from Santa Paula, California, so that the ranges of these two forms are not geographically separated.

107. DASYMUTILLA MIMULA, new species

Plate 4, fig. 26

Male.—Head and thorax black; abdomen clothed with light fulvous pubescence. Length, 13 mm.

Head black, clothed with long, erect and recumbent, black hairs; mandibles tridentate, clypeus feebly bidentate medially on the anterior margin, the apical half coarsely, and confluently punctate; scape punctured and clothed with coarse, black hairs; first segment of flagellum slightly shorter than the second; antennal scrobes distinctly carinate above; front with large, shallow, confluent punctures; vertex and genae with rather sparse, shallow punctures; relative widths of head and thorax, 6.5–8.

Thorax black, clothed with long, erect and recumbent, black hairs; pronotum coarsely, confluently punctate, the punctures larger and deeper towards the lateral margins, the cephalic margin of the pronotum not emarginate medially; mesonotum, scutellum and metanotum coarsely and confluently punctate; propleura punctate anteriorly, rugose along the posterior margin; anterior half of mesopleura with distinct, sparse pnnctures, the posterior half with very large, close, punctures; metapleura shining, impunctate except for a few scattered punctures ventrally; sides of propodeum broadly, shallowly reticulate; dorsum and posterior face of propodeum very broadly and deeply reticulate; tegulae smooth and shining except for a few punctures near the basal margin.

Abdomen black; first segment of abdomen subnodose, ventral carina not produced into a prominent tooth, tergite smooth, with scattered punctures anteriorly, the posterior third closely, confluently punctate, clothed with sparse, long, black hairs; second tergite with moderate, separated punctures, those near the lateral basal margins closer and elongate, clothed with long, black hairs on the anterior half and long, light fulvous hairs on the posterior half; tergites 3–6 distinctly punctate, clothed with long, light fulvous pubescence; last tergite longer than broad, finely granulated medially, very finely rugose at the tip, with a fringe of long, light fulvous hairs at the basal margin, and without an apical fringe of hair at the apical margin; second sternite with scattered, shallow, elongate punctures, the median area occupied by a pit densely filled with fine hairs; sternites 3–6 punctate, with a fringe at the apical margin consisting of long, black hairs medially and a few light fulvous hairs laterally; last sternite irregularly punctate, the postero-lateral angles rounded.

Legs black, clothed with black hairs.

Wings dark fuliginous; veins r–m and R_5 adjacent on vein r.

Holotype.—Male, Cat. No. 40744, U.S.N.M., California.

This species is quite like *cotulla* of the *fulvohirta* group in general appearance but differs in the following characters: first abdominal segment subnodose, last tergite longer than broad, postero-lateral angles of last sternite rounded, veins r–m and R_5 adjacent on vein r. The genitalia of this species are also quite different from those of *cotulla* as will be seen from the figures.

108. DASYMUTILLA INTERMIXTA, new species

Plate 4, fig. 27

Male.—Head and thorax black, clothed with a mixture of long, black, and white hairs; abdomen red, except the basal and apical segments black. Length, 13 mm.

Head black, clothed with sparse, long, black, erect hairs and recumbent, whitish hairs, the latter more conspicuous on the front; mandibles tridentate; clypeus bidentate medially on the anterior margin, closely and confluently punctate; scape bicarinate beneath, closely punctured and sparsely clothed with long, black hairs; first segment of flagellum distinctly shorter than the second; antennal scrobes distinctly carinate above; front and vertex with large, shallow confluent punctures; genae with moderate, shallow, confluent punctures; relative widths of head and thorax 6.5–8.

Thorax black, the prothorax, mesopleura and scutellum with sparse, white hairs intermixed with long, erect black hairs, the mesonotum and propodeum with long, black hairs only (in several of the paratypes the propodeum is also clothed with white hair); pronotum, mesonotum, scutellum, and metanotum with coarse, shallow, confluent punctures; pronotum with its cephalic margin slightly emarginate medially, the anterior face of the emargination glabrous; propleura irregularly punctate, the majority of the punctures minute; the mesopleura with large, separated punctures throughout, a few scattered minute punctures near the anterior margin; metapleura smooth and shining, impunctate except for a few scattered punctures ventrally; sides of propodeum with scattered, shallow punctures on the anterior half, shallowly and broadly reticulate on the posterior half; dorsum and posterior face of propodeum deeply, broadly reticulate; basal third of tegulae punctured and hirsute, the remainder smooth and shining.

Abdomen red, except the basal and apical segments black; first segment black (in several of the paratypes slightly reddish and clothed with pale hairs), subnodose, the ventral carina not produced posteriorly, the tergite closely, confluently punctate, especially so on the apical third, clothed with long, black hairs and a thin apical fringe of red hairs; second tergite red, closely punctured at the base and sides, the punctures separated on the disk, sparsely clothed with long, red hairs, and with a thick apical fringe of red hairs; tergite 3 red, 4–6 blackish, all with close, deep punctures and long, red hairs; apical segment black, smooth, shining, with a broad fringe of black hairs at the base; second sternite red, with large, separated, elongate punctures, the median area occupied by a large pit densely filled with pale hairs, the apical margin with a thick fringe of red hairs; third sternite reddish, fourth sternite blackish, both punctured at the apical margin and with an apical fringe of red hairs; sternites five and six black with a thin apical fringe of black pubescence; last sternite black, with scattered punctures and erect, black hairs.

Legs black, clothed with white hairs; calcaria dark.

Wings dark fuliginous; veins r–m and R_5 approximate on vein r.

Holotype.—Male, Post Creek Canyon, Pinaleno Mountains, Fort Grant, Arizona, July 15–18, 1917 (J. Bequaert); in collection of University of Minnesota.

Paratypes.—Male, San Bernardino Ranch, Douglas, Arizona, August (F. H. Snow); male, Post Creek Canyon, Pinaleno Mountains, Fort Grant, Arizona, July 15–18, 1917 (J. Bequaert); 3 males, Pinaleno Mountains, Fort Grant, Arizona, July 15–19, 1917; male, Sabino Basin, St. Catalina Mountains, Arizona, July 8–20, 1916; male, Tucson, Arizona, July 9, 1920; male, Tucson, Arizona, August 20, 1920; male, Santa Rita Mountains, Arizona, September 3, 1919; 3 males, Baboquivaria Mountains (F. H. Snow); male, Steins, New Mexico, July 14, 1917. Paratypes in collections of Cornell University, United States National Museum, American Museum of Natural History, University of Minnesota, University of Kansas, University of Arizona, J. Bequaert, and the author.

This species is superficially like *sumichrasti* male described by Saussure. I have not seen an authentic male specimen of that species. It is not likely that this is *sumichrasti*, however, as no females of that species are known from the United States. *Intermixta* may be easily recognized by the mixture of white and black hairs on the head and thorax, the white hairs on the legs, the red abdomen with the basal and apical segments black, and the pit on the second sternite.

GROUP NOGALENSIS

Females with the head narrower than the thorax, the thorax subhexagonal and longer than broad, scutellar scale present, pygidium longitudinally striate, and middle and hind femora broadly truncate at the apex, the surface of the outer lobe of the truncation sulcate. Males unknown.

109. DASYMUTILLA NOGALENSIS, new species

Female.—Head and thorax very dark mahogany red, apparently black, clothed with black pubescence; abdomen ferruginous, clothed above and beneath with fulvous pubescence; pygidium longitudinally striate; intermediate and posterior femora squarely truncate at the apex, the surface of the outer lobe of the truncation sulcate. Length, 14 mm.

Head very dark mahogany red, clothed throughout with long, coarse, black pubescence; mandibles acute at the apex, unidentate within about one-third the distance from the apex to the base; clypeus bidentate medially on the cephalic margin; anterior half of clypeus glabrous, impunctate, separated from the posterior half by a sinuate elevated carina; narrow area posterior to the carina densely punctate and pubescent, the pubescence forming the clypeal fringe; scape coarsely, shallowly punctate above, clothed with short, coarse, black pubescence; first segment of flagellum twice as long as it is broad at the apex, about as long as segments two and three united; antennal scrobes strongly carinate above; front and vertex very coarsely, confluently punctate; genae with large, more or less confluent punctures, but not as coarsely punctured as the front and vertex; relative widths of head and thorax, 8.75–9.25.

Thorax very dark mahogany red, clothed throughout with erect and appressed, coarse, black pubescence; dorsum of thorax confluently foveate; scutellar scale well developed; propleura with large contiguous punctures; anterior half of mesopleura finely punctate, the posterior half elevated and coarsely punctate; ventral half of metapleura with large, contiguous punctures, the dorsal half glabrous, impunctate; sides of propodeum with large, scattered punctures anteriorly, coarsely, and deeply foveate posteriorly; dorsum and posterior face of propodeum deeply, coarsely, foveately reticulate.

Abdomen ferruginous, clothed above and beneath with long, erect, and appressed, fulvous pubescence, except the disk of the first tergite with sparse, erect, black pubescence; first tergite glabrous, impunctate, except the apical margin coarsely, closely punctate; second tergite coarsely, contiguously foveate; tergites 3–5 coarsely and closely punctate; pygidium longitudinally striate; first sternite with a prominent tooth anteriorly; second sternite with large, distinct punctures, the latter sparse on the disk, close and coarser at the sides and apex; sternites 3–5 densely punctate.

Legs dark mahogany red, clothed with long, coarse, black pubescence; middle and hind femora squarely truncate at the apex, the face of the outer lobe of the truncation sulcate; calcaria black.

Holotype.—Female, Nogales, Arizona, July 19, 1903 (Oslar); in collection of Cornell University, No. 761.1.

PARATYPE MATERIAL

ARIZONA: Female, Nogales, June 22, 1903 (Oslar); female, Nogales, July 1, 1903 (Oslar); female, Nogales, July 17, 1903 (Oslar); female, Nogales, July 20, 1903 (Oslar); 7 females, Douglas, San Bernardino ranch, August (F. H. Snow); 7 females, San Bernardino ranch, Cochise County, August (F. H. Snow); 4 females, Carr Canyon, Huachuca Mountains, August, 1905 (H. Skinner); female, Huachuca Mountains, August 15, 1903 (Oslar); female, Tucson, June 25, 1924 (A. A. Nichol); female, Tucson, July 27, 1917; female, Kits Peak, Baboquivaria Mountains, August 1–4, 1916; 7 females, Baboquivaria Mountains (F. H. Snow); 2 females, Sabino Basin, St. Catalina Mountians, July 8–20, 1916; female, Fort Grant, Pinaleno Mountains, July 17, 1917; 4 females, Fort Grant, Pinaleno Mountains, July 18, 1917; female, Fort Grant, Pinaleno Mountains, July 19, 1917; female, Bonita, Graham County, July 12, 1917; female, Bonita, July 18, 1917 (H. H. Knight); female, Palmerlee, July 21 (H. A. Kaeber); female, Soldier Canyon, August 17, 1919. Paratypes in collections of Cornell University, University of Minnesota, United States National Museum, American Museum of Natural History, American Entomological Society of Philadelphia, University of Kansas, H. H. Knight, and the author.

Superficially this species resembles *klugii*, *magnifica*, and *gorgon*, but differs very materially in the general sculpture of the body and in the character of the middle and hind femora. It is most closely related to the following species. The structure of the middle and hind femora is similar to that found in the *obscura* group. This species had been recognized as new by Dr. J. C. Bradley and I have used his manuscript name, *nogalensis*.

110. DASYMUTILLA HELVA, new species

Female.—Very dark red, almost black; clothed with very pale yellow, almost white, long, erect pubescence; middle and hind femora squarely truncate at the apex, the face of the outer lobe of the truncation sulcate. Length, 12 mm.

Head broad, transverse, clothed throughout with sparse, pale yellowish-white hairs; mandibles acute at the apex and with a small tooth within; scape clothed with pale hairs; first joint of flagellum slightly more than twice as long as its width at the apex; antennal scrobes distinctly carinate above; front and vertex very coarsely. confluently punctured; genae with moderate, separated, shallow punctures, not nearly as coarsely sculptured as the front and vertex, rounded posteriorly; relative widths of head and thorax, 8–9.

Thorax slightly longer than broad, clothed with long, erect, pale yellowish-white hairs, except the anterior half of mesopleura, the metapleura, and the sides and posterior face of the propodeum clothed with black hairs; dorsum of thorax very coarsely, deeply, and confluently punctured; junction of the thoracic notum and the propodeum defined by an irregular transverse carina and scutellar scale; propleura moderately punctate; anterior half of mesopleura finely punctured, the posterior half coarsely punctured; metapleura glabrous, irregularly punctate on the basal third; anterior half of sides of propodeum glabrous, with sparse, moderate punctures; posterior half of sides of propodeum and posterior face of propodeum very coarsely and deeply reticulate.

First abdominal tergite subsessile, glabrous, a few scattered punctures on the disk, and the apical margin closely punctate, clothed with black, erect hairs, except a few scattered pale hairs medially at the apical margin; basal margin of second abdominal tergite glabrous, impunctate, remainder of tergite with moderate, close, irregular punctures; tergites 3–5 with moderate close punctures, the latter somewhat smaller than those of the second tergite; basal margin of second tergite with a few long, black, erect hairs, remainder of second tergite and tergites 3–6 clothed with long, erect, pale, yellowish-white hairs; pygidium very strongly longitudinally striate; carina of first sternite terminating anteriorly in a prominent tooth; second sternite glabrous, with sparse, shallow punctures; apical margins of sternites 3–5 very closely, confluently punctate; sternites one and two very sparsely clothed with erect, pale, yellowish-white hairs; sternites 2–5 with thick apical fringes of pale, yellowish-white hairs.

Legs very dark red or black; middle and hind femora squarely truncate at the apex, the face of the outer lobe of the truncation sulcate; coxae, trochanters, femora and tibiae above clothed with sparse, pale, yellowish-white hairs; tibiae beneath and tarsi clothed with black hairs.

Holotype.—Female, Cat. No. 40747, U.S.N.M., Phoenix, Arizona, July 25, 1917 (W. D. Pierce).

Paratypes.—Female, Phoenix, Arizona, June 20, 1913 (E. E. Russell), 5 females, Baboquivaria Mountains, Arizona (F. H. Snow); female, Tucson, Arizona, August 24, 1922; female, Tucson, June 28, 1924 (A. A. Nichol); 2 females, Glendale, Arizona, August 12, 1907 (E. S. G. Titus); female, Tempe, Arizona, August 5, 1917; 2 females, Envir de Guadalajara, Estat de Jalisco, Mexico, 1901 (M. Diguet); 3 females, between San Jose de Cabo and Triunfo, California, 1911. Paratypes in collections of American Museum of Natural History, University of Minnesota, University of Kansas, University of Arizona, Cornell University, Utah Agricultural College, State Entomologist of Arizona, and the author.

This species is related to the preceding one but is easily distinguished by the differences in the color of the pubescence. It has been confused with *magna* and may be separated from the latter by the structure of the femora at the apex. The paratypes vary in length from 11 mm. to 17 mm.

GROUP OBSCURA

Females with the head as wide or wider than the thorax; thorax pyriform; scutellar scale absent; pygidium granular; femora of middle and hind legs squarely truncate at the apex, the faces of the truncation sulcate. Males with the clypeus very prominently bidentate medially; second sternite without a median pit densely filled with hairs; middle and hind femora modified at the apex like those of the females.

111. DASYMUTILLA OBSCURA (Blake)

Plate 4, fig. 30

Mutilla (*Sphaerophthalma*) *obscura* BLAKE, Trans. Amer. Ent. Soc., vol. 3, p. 239, 1871, male.

Mutilla (*Sphaerophthalma*) *scaevola* BLAKE, Trans. Amer. Ent. Soc., vol. 3, p. 247, 1871, female.

Mutilla admetus BLAKE, Trans. Amer. Ent. Soc., vol. 4, p. 74, 1872, male.—BLAKE, Trans. Amer. Ent. Soc., vol. 7, p. 244, 1879, male.—DALLE TORRE, Cat. Hymen., vol. 8, p. 6, 1897, male.—FOX, Trans. Amer. Ent. Soc., vol. 25, p. 245, 1899, male.

Mutilla obscura BLAKE, Trans. Amer. Ent. Soc., vol. 7, p. 244, 1879, male.—DALLE TORRE, Cat. Hymen., vol. 8, p. 67, 1897, male.—FOX, Trans. Amer. Ent. Soc., vol. 25, p. 245, 1899, male.—MELANDER, Trans. Amer. Ent. Soc., vol. 29, p. 300, 1903, male, female.

Mutilla scaevola BLAKE, Trans. Amer. Ent. Soc., vol. 7, p. 245, 1879, female.—DALLE TORRE, Cat. Hymen., vol. 8, p. 84, 1897, female.—FOX, Trans. Amer. Ent. Soc., vol. 25, p. 241, 1899, female.

Sphaerophthalma macer (*macerata*) BLAKE, Trans. Amer. Ent. Soc., vol. 13, pp. 227, 286, 1886, male.

Sphaerophthalma admetus BLAKE, Trans. Amer. Ent. Soc., vol. 13, p. 229, 1886, male.

Sphaerophthalma obscura BLAKE, Trans. Amer. Ent. Soc., vol. 13, p. 231, 1886, male.

Sphaerophthalma scaevola BLAKE, Trans. Amer. Ent. Soc., vol. 13, p. 241, 1886, female.

Mutilla macera DALLE TORRE, Cat. Hymen., vol. 8, p. 56, 1897, male.

Ephuta (*Ephuta*) *admetus* ANDRÉ, Gen. Ins., vol. 1, fasc. 11, p. 57, 1903, male.

Ephuta (*Ephuta*) *obscura* ANDRÉ, Gen. Ins., vol. 1, fasc. 11, p. 62, 1903, male.

Ephuta (*Ephuta*) *scaevola* ANDRÉ, Gen. Ins., vol. 1, fasc. 11, p. 63, 1903, female.

Mutilla (*Dasymutilla*) *apachea* VIERECK, Trans. Amer. Ent. Soc., vol. 33, p. 386, 1907, male.

Dasymutilla (*Dasymutilla*) *obscura* Bradley, Trans. Amer. Ent. Soc., vol. 42, p. 330, 1916, male, female.

Dasymutilla obscura Banks, Ann. Ent. Soc. Amer., vol. 14, p. 25, 1921, female.

Dasymutilla admetus Mickel, 19th Rept. State Ent. Minn., p. 111, 1923, male.

Type.—Male, Massachusetts, collection of Prof. Louis Agassiz. The type of this species is apparently lost. I have been unable to locate it in the collections of the American Entomological Society of Philadelphia or in the Museum of Comparative Zoölogy at Cambridge. The types of *scaevola*, *macer*, and *admetus* are in the collection of the American Entomological Society of Philadelphia. The type of *apachea* is in the collection of the University of Kansas.

Plesiotype.—Male, Louisiana, in collection of United States National Museum.

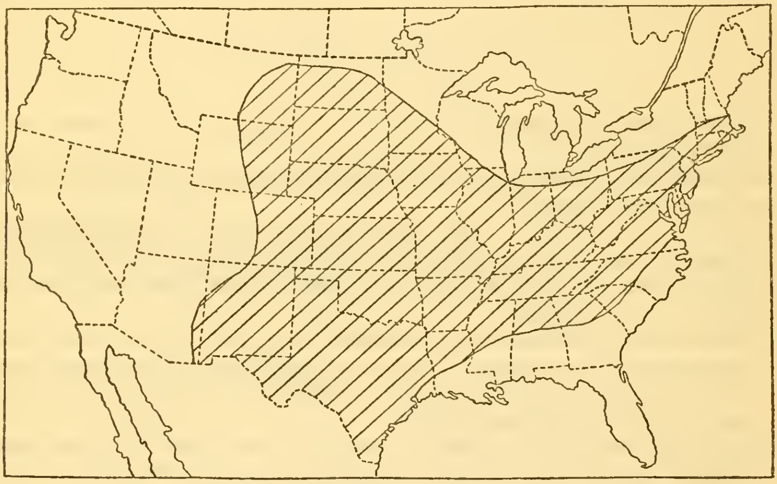

Fig. 28.—Distribution of Dasymutilla obscura (Blake)

Distribution.—Massachusetts, New Jersey, Pennsylvania, Virginia, Georgia, Tennessee, Minnesota, Iowa, Louisiana, Texas, New Mexico, Arizona, Colorado, Kansas, Nebraska, South Dakota, North Dakota, Wyoming, Montana. (Fig. 28.)

SPECIMENS EXAMINED

Arizona: Male, Fort Apache, August 26, 1897 (Type of *apachea* Viereck).

Colorado: Female, VaDale, August 15, 1903; male, Fort Collins, July 4, 1900; female, Salida, July 24, 1906 (W. M. Wheeler).

Georgia: Female, 2 males, Tallulah Falls, June 19–25, 1909 (J. C. Bradley); male, Dewitt, Mitchell County, August 7, 1915 (C. S. Spooner).

Iowa: Female, Sioux City, July 27, 1923 (C. N. Ainslie).

Kansas: Female, Wellsville, July 23, 1901; female, Wabaunsee County (Forrest Anderson); 4 females, Riley County, June 26 (G. A. Dean); female, Riley County, July 3, (Popenoe); female, Riley County, July 22 (J. B. Norton);

female, Riley County, August 9 (J. B. Norton); female, Riley County, August (Marlatt); male, Riley County, September 1 (Popenoe); female, Clark County, August 24, 1911 (F. X. Williams); female, Trego County, July 12, 1912 (F. X. Williams); female, Lane County (F. X. Williams); male, Sheridan County (F. X. Williams); male, Decatur County (F. X. Williams); 3 females, Greeley County (F. X. Williams); female, Sherman County (F. X. Williams); female, Wallace County (F. H. Snow); male, Cheyenne County (F. X. Williams); 24 females (T. B. A.).

LOUISIANA: Female, Alexandria, July 30, 1908 (E. S. Tucker); male, Logansport, June 1, 1918 (J. C. Bradley); 11 males.

MINNESOTA: 2 females, Anoka County, Fridley sand dunes, July 24, 1923 (C. E. Mickel); male, Anoka County, Fridley sand dunes, July 28, 1922 (C. E. Mickel); 2 males, Anoka County, Fridley sand dunes, August 3, 1924 (R. W. Dawson).

MONTANA: Female, Miles City, August 29, 1915; female, Billings, August 14, 1906; male, Huntley, July 23, 1917.

NEBRASKA: Female, Plattsmouth, September 3, 1923 (C. B. Philip); female, Linclon, August; female, Maskel, July 20, 1915 (E. G. Anderson); 2 females, 2 males, West Point, June, 1887; male, Carns, July 28, 1902 (W. D. Pierce); female, Scottsbluff, August 5, 1923 (Leonard Worley); female, Mitchell, July 25, 1916 (C. E. Mickel); female, Glen, Sioux County, July 12, 1910 (L. Bruner); female, Glen, Sioux County, August 20, 1906 (H. S. Smith); male, Harrison, August 4, 1908 (C. H. Gable); female, Harrison, August 12, 1912 (R. W. Dawson); male, Harrison, August 20, 1912 (R. W. Dawson); female, Monroe Canyon, Sioux County, July 28, 1913 (R. W. Dawson); female, Monroe Canyon Sioux County, August 7, 1908 (C. H. Gable); 2 females, Monroe Canyon, Sioux County, August 27, 1912 (R. W. Dawson); female, Sioux County.

NEW JERSEY: Female, Haddonfield, February 1, 1889; female, DaCosta, July 20, 1902 (E. Daecke).

NEW MEXICO: Male, Maxwell (G. W. Barber); male, Jemez Springs, June 21, 1916 (John Woodgate); male, Koehler, August 12, 1914 (W. R. Walton).

NORTH DAKOTA: 10 females, 3 males, Medora, August 3, 1923 (O. A. Stevens); female, Medora, August 23, 1923 (O. A. Stevens); female, Cannon Ball, August 20, 1922 (O. A. Stevens); 6 males, Beach, August 22, 1921 (C. N. Ainslie).

PENNSYLVANIA: Male, Heckton Mills, July 8, 1910 (P. R. Myers); female, Heckton Mills, August 21, 1910; female, Heckton Mills, September 6, 1910 (H. B. Kirk); female, Rockville, July 19, 1913.

SOUTH DAKOTA: Female, Canton, August 28, 1923 (H. C. Severin); female, Platte, July 20, 1923 (C. N. Ainslie); male, Pierre; male, Buffalo, July 31, 1924.

TENNESSEE: Female, Allardt, Fentress County, August 20, 1922 (T. H. Hubbell); female, Grassy Cove, Cumberland County, July 7, 1922 (T. H. Hubbell).

TEXAS: Female, Runge, September 21, 1906 (J. C. Crawford); male, San Antonio, April 12, 1909 (R. A. Cushman); female, San Antonio, September 11 (J. C. Crawford); female, Trinity, August 30, 1906 (F. C. Bishopp); male, Fedor, April 28; female, Fedor, May 11, 1898 (Birkman); female, Fedor, May 14, 1898 (Birkman); female, male, Fedor, May 28, 1901 (Birkman); female, Fedor, June 2, 1909 (Birkman); female, Lee County, May, 1908; female, Lee County, June, 1908; 2 females, Lee County, August, 1905; female, Lee County, September 7, 1905; male, Overton, August 22, 1907 (W. W. Yothers); male, Mineola, August 6, 1904 (C. R. Jones); female, Eastland County, June 8, 1921 (Grace O. Wiley); female, Eastland County, June 14, 1921 (Grace O. Wiley); male, Alpine, June 28–30 (Wickham); female, male, Childress, June 8, 1906 (J. D. Mitchell); 2 females, 2 males.

VIRGINIA: Female, Great Falls, July 8; 2 females, Kerney, August 15, 1913 (W. Middleton); 2 females, Wingina, August 3, 1916 (W. T. Davis); female, East Falls Church, July 13, 1912 (W. Middleton); male, Falls Church, July 12; male, Falls Church, July 16; female, Falls Church, August 27; female, Falls Church, August; 2 females, Falls Church, September 1, 1915 (C. T. Greene).

WYOMING: Female, Douglas.

This species exhibits a remarkable variation in size throughout its entire range. The females vary in length from 5 mm. to 14 mm., while the males vary in length from 5 mm. to 13 mm. The types of *macer*, *admetus*, and *apachea* have been examined and found to agree with this species. While it is possible that more than one species is represented in the material examined I have been unable to find any evidence that such is the case. Bradley (1916) pointed out that the females from the East have the legs slightly darker than specimens from the Middle and Western States, but there does not seem to be any good evidence for considering this character as specific. The type of *apachea* is similar to small specimens of *obscura* from both the Middle and Eastern States.

112. DASYMUTILLA SNOWORUM (Cockerell and Fox)

Sphaerophthalma snoworum COCKERELL and FOX, Proc. Acad. Nat. Sci.. Phila., p. 135, 1897, male.

Mutilla snoworum FOX, Trans. Amer. Ent. Soc., vol. 25, p. 246, 1899, male.

Ephuta (*Ephuta*) *snoworum* ANDRÉ, Gen. Ins., vol. 1, fasc. 11, p. 64, 1903, male.

Type.—Male, Albuquerque, New Mexico (Snow), in collection of American Entomological Society of Philadelphia.

Distribution.—New Mexico.

SPECIMENS EXAMINED

NEW MEXICO: Male, Albuquerque, July 19, 1902 (Oslar); male, Albuquerque, 1894 (F. H. Snow).

This species is closely related to *obscura* but may be separated from it and other related forms by the characters given in the key. This specimen has been compared with the type and found to be identical with it. The genitalia are like those of *obscura* and are therefore not figured.

113. DASYMUTILLA POECILONOTA (Melander)

Mutilla poecilonota MELANDER, Trans. Amer. Ent. Soc., vol. 29, p. 301, 1903, female.

Type.—Female, Trans-Pecos region of Western Texas, in collection of Washington State College, Pullman, Washington.

Distribution.—Texas, Kansas, Nebraska, Montana, New Mexico, and Arizona.

SPECIMENS EXAMINED

ARIZONA: Female, Wilcox, June 8, 1909 (A. K. Fisher); female, Wilcox, July 31, 1909 (A. K. Fisher); female, Winslow, July 31 (Barber and Schwarz).

KANSAS: Female, Grant County, July 23, 1911 (F. X. Williams).

MONTANA: Female, Billings, July 30, 1910.

NEBRASKA: Female, Lincoln.

NEW MEXICO: Female, Las Vegas, July 20, 1902 (Oslar); 2 females, Maxwell, 1916 (G. W. Barber); female, Koehler, August (H. F. Wickham); female, Jemez Springs, June 20, 1916 (John Woodgate); female, Jemez Springs, August 1 (John Woodgate); female, Jemez Springs, August 12 (John Woodgate); female, Deming, July 18, 1907.

TEXAS: Female, Del Rio, May 8, 1907 (F. C. Bishopp); female, Alpine, June 28–30 (Wickham); female, Balmorhea, October 5, 1924 (Sanborn and Scholls); female, Phantom Lake, Fort Davis Quad, June 1, 1916 (F. M. Gaige).

The general color of *poecilonota* is darker than in *obscura* and the golden pubescence of the head and thorax is so dense as to conceal the sculpturing of the body surface, while in *obscura* the pubescence of the head and thorax is sparse. Specimens vary in length from 8 mm. to 13 mm. Through the kindness of Dr. A. L. Melander I have been able to examine the type of this species, and the material studied is identical with it.

114. DASYMUTILLA HELIOPHILA (Cockerell)

Sphaerophthalma heliophila COCKERELL, Entomologist, vol. 33, p. 65, 1900, female.

Ephuta (*Ephuta*) *heliophila* ANDRÉ, Gen. Ins., vol. 1, fasc. 11, p. 60, 1903, female.

Dasymutilla welltonensis BRADLEY and BEQUAERT, Amer. Mus. Novitates, no. 82, pp. 1–3, 1923.

Type.—Female, Glendale, Arizona, October 31, 1899 (Cockerell), in collection of United States National Museum. The type of *welltonensis* is in the collection of Cornell University.

Distribution.—Arizona.

SPECIMENS EXAMINED

ARIZONA: Female, Florence, September 4, 1903 (C. R. Biederman); female, Bill Williams Fork, September (F. H. Snow); 4 females, Wellton, Yuma County. August 9, 1917.

The types of *heliophila* Cockerell and *welltonensis* Bradley and Bequaert have been examined and found to be identical. *Heliophila* is very distinct from other females of this group in sculpture and pubescent markings. The absence of a carina on the postero-lateral angles of the head and the presence of a carina on the antennal scrobes above, identify it at once.

115. DASYMUTILLA CHRYSOCOMA, new species

Female.—Ferruginous; head wider than the thorax, densely clothed with appressed, golden yellow pubescence, the postero-lateral angles sharply carinate; thorax pyriform, clothed above with pale golden pubescence, the disk with a spot of black pubescence; pygidium granular; length, 13 mm.

Head ferruginous; mandibles long, a blunt tooth within a little beyond the middle; clypeus divided by a transverse sinuate carina, that portion of the clypeus anterior to the carina glabrous, impunctate; narrow area posterior to the carina closely punctate; clypeal fringe composed of long, pale yellow pubescence; antennal tubercles distinctly separated; scape long, curved, with large, shallow punctures above and clothed with sparse, silvery pubescence; first segment of flagellum twice as long as it is wide at the apex, about as long as segments two and three united; antennal scrobes strongly carinate above; front very coarsely, deeply, and confluently punctate, the vertex and genae with large, continuous punctures; the front, vertex, and genae densely clothed with appressed, golden yellow pubescence and scattered, erect, pale hairs; postero-lateral angles of the head sharply carinate; relative widths of head and thorax, 10–8.5.

Thorax ferruginous, pyriform; dorsum of thorax contiguously, foveately punctured, the fovea becoming very deep and very large on the posterior face of the propodeum; dorsum sparsely clothed with appressed silvery pubescence and scattered, erect, pale hairs, except for a transverse median spot of sparse, appressed, black pubescence; the appressed ,silvery pubescence somewhat denser on the dorsal area of the posterior face of the propodeum; scutellar scale entirely absent; propleura defined anteriorly by a sharp carina extending from the ventral margin to the humeral tubercle; propleura finely closely punctured, with a few large punctures near the anterior margin, clothed with thick, appressed, silvery pubescence; anterior two-thirds of mesopleura finely, closely punctured, clothed with thin, appressed, silvery pubescence; the posterior third with large, contiguous punctures, clothed with thick, appressed, silvery pubescence, and scattered, long, erect, pale hairs; metapleura with a few large punctures ventrally and finely, closely punctured elsewhere, densely clothed with appressed, silvery pubescence, the punctuation obscured by the pubescence; sides of propodeum mostly glabrous, impunctate, a few large, indistinct, shallow punctures dorsoposteriorly.

Abdomen ferruginous; first tergite deeply foveately punctured posteriorly, the disk with large, shallow, indistinct punctures and an area of fine close punctures along the longitudinal median line, with scattered, long, erect, pale hairs, and a median transverse, apical spot of dense, appressed, silvery pubescence; narrow basal margin of second tergite glabrous, impunctate, the remainder with deep, elongate punctures, large and separated laterally, large and contiguous on the disk, small and confluent on the apical fifth which is slightly depressed; second tergite clothed with sparse, appressed, silvery pubescence and scattered, erect hairs, except the apical fifth and a subbasal median transverse spot connected by a narrow longitudinal line, all with black pubescence; the lateral margins and extreme lateral portions of apical fifth with dense silvery pubescence; tergites 3–5 coarsely, confluently punctate; 3 and 4 clothed entirely with appressed, silvery pubescence and erect, pale hairs, except for lateral subdorsal spots of black in the apical fringe; tergite 5 clothed with black pubescence except for a large, median area of appressed, silvery pubescence; pygidium granular, the pygidial tergite clothed laterally and basally with long, black pubescence; first sternite elevated anteriorly along the median longitudinal line to form a carina, the carina not toothed; lateral areas of first sternite with confluent punctures and scattered, erect, pale hairs; second sternite with large, elongate, distinct punctures throughout, except the subapical margin slightly depressed and confluently punctate; second sternite with scattered pale hairs and a thin apical fringe of silvery pubescence; subapical margins of sternites 3–5 confluently punctate; sternites 3 and 4 with thin apical fringes of silvery pubescence, 5 with an apical fringe of dark pubescence; ultimate sternite confluently punctured, sparsely clothed with dark pubescence.

Legs ferruginous, the tibial spines darker than the tibia; calcaria pale ferruginous; apices of middle and hind femora squarely truncate, the apices expanded each side, the expanded areas sulcate.

Holotype.—Female, Kits Peak Rincon, Baboquivaria Mountains, Arizona, August 1–4, 1916; in collection of American Museum of Natural History.

Paratype.—Female, Tucson, Arizona, July 26, 1921; in collection of University of Minnesota.

A very striking species, readily recognizable by the sharp carina on the postero-lateral angles of the head, and the broad band of black pubescence at the apex of the second abdominal tergite.

116. DASYMUTILLA DILUCIDA, new species

Female.—Ferruginous; head wider than the thorax, densely clothed with appressed, golden pubescence, the postero-lateral angles carinate; thorax pyriform, sparsely pubescent; second abdominal tergite silvery pubescent apically at the middle; pygidium granulate; length, 9 mm.

Head ferruginous; mandibles long, bluntly toothed within just beyond the middle; clypeus divided by a transverse sinuate carina, that portion of the clypeus anterior to the carina glabrous, impunctate, the portion immediately posterior to the carina confluently punctate; clypeal fringe of long, pale yellow pubescence; antennal tubercles distinctly separated; scape long, curved, indistinctly punctate with shallow punctures, sparsely clothed with silvery pubescence; first segment of flagellum twice as long as it is broad at the apex, not as long as segments 2 and 3 united; antennal scrobes carinate above; front and vertex confluently punctate, the genae with close contiguous punctures; front and vertex densely clothed with appressed golden pubescence and scattered, erect, pale hairs; the genae with sparse, appressed, silvery pubescence; postero-lateral angles of the head distinctly carinate, the carina somewhat crenulate; relative widths of head and thorax, 6.5–5.75.

Thorax ferruginous, pyriform; dorsum confluently foveate, the fovea becoming larger and more distinct on the propodeum, the dorsum and posterior face of the latter broadly reticulate, except the disk of the ventral half of the posterior face of the propodeum glabrous, microscopically punctate; dorsum sparsely clothed with appressed, silvery pubescence excepting an obscure median transverse spot where the pubescence is black; a spot of somewhat denser silvery pubescence on the disk of the propodeum; scutellar scale entirely absent; anterior margin of propleura defined by a sharp carina extending from the ventral margin to the humeral tubercle; propleura finely punctured, with a few large scattered punctures, somewhat densely clothed with appressed, silvery pubescence; anterior half of mesopleura very finely punctate, sparsely clothed with appressed silvery pubescence; posterior half of mesopleura with large, confluent punctures, sparsely clothed with appressed, silvery pubescence and scattered, erect, pale hairs; metapleura with coarse punctures along the ventral margin, elsewhere indistinctly, finely punctate, somewhat densely clothed with appressed, silvery pubescence; sides of propodeum glabrous, impunctate except near the posterior margin, where the reticulations extend over from the posterior face.

Abdomen ferruginous; first tergite deeply, foveately punctured posteriorly, glabrous, more or less impunctate anteriorly, with a slight, median, longitudinal depression, the latter finely punctate; clothed with scattered, long, erect, pale hairs, and a median apical spot of dense, appressed, silvery pubescence; narrow lateral areas at the base of the second tergite glabrous, impunctate; remainder of the tergite with dense, confluent punctures, the latter somewhat larger and more separated toward the lateral margins; second tergite with a large, subrounded, basal, median spot, connected with a narrow subapical band which merges with the apical fringe subdorsally, all of sparse, appressed, black pubescence; the apical fringe medially and laterally silvery, black each side subdorsally; remainder of tergite

2 clothed with sparse appressed, silvery pubescence and scattered, erect, pale hairs; tergites 3–5 densely, confluently punctate, clothed with sparse, appressed, silvery pubescence, and scattered, erect, pale hairs, the apical fringes silvery at the middle and lateral margins, black subdorsally, except 5 in which the black apical fringe extends to the lateral margins of the tergite; pygidial segment with dense, long black pubescence at the base and sides; pygidium granulate; first sternite elevated anteriorly along the median longitudinal line to form a carina, the latter not toothed; lateral areas of the sternite indistinctly punctate, clothed with scattered, erect, pale hairs; second sternite with large, distinct, elongate punctures throughout except the apical margin somewhat depressed and confluently punctate, with scattered, erect, pale hairs throughout, and a thin apical fringe of silvery pubescence; apical margins of sternite 3–5 confluently punctate; sternites 3 and 4 with a thin apical fringe of silvery pubescence; sternite 5 with an apical fringe of black pubescence; ultimate sternite confluently punctured at the sides and apex, the punctured area clothed with long, dark hairs.

Legs ferruginous, the tibial spines darker than the tibia; calcaria pale; apices of middle and hind femora squarely truncate, the apices expanded each side, the expanded areas sulcate.

Holotype.—Female, Cat. No. 40748, U.S.N.M., Dawson Camp, Salt River, Arizona, September 5 (C. H. T. Townsend).

Paratypes.—Female, Baboquivaria Mountains, Arizona (F. H. Snow); female, Sabino Basin, St. Catalina Mountains, Arizona, July 8–20, 1916; in collections of University of Kansas and American Museum of Natural History.

This species is very similar in appearance to *chrysocoma* but differs in having the carina of the postero-lateral angles of the head somewhat crenulate, and in lacking the broad band of black pubescence at the apex of the second abdominal tergite. In this species the apex at the middle is clothed with silvery pubescence, and there is a narrow subapical band of black pubescence which unites subdorsally with the black apical fringes.

117. DASYMUTILLA ERRABUNDA, new species

Male.—Ferruginous; the head, and dorsum of the thorax dark. the remainder of the body bright ferruginous; head, thorax, legs, and abdomen except apical margins of segments 5 and 6, all clothed with mostly erect, silvery pubescence; length, 9.5 mm.

Head subquadrate, dark mahogany red, clothed throughout with moderately dense, erect and semirecumbent, silvery pubescence; mandibles long, acute at the apex, unidentate within near the apex; clypeus very prominently bidentate medially on the cephalic margin, strongly, contiguously punctate on the disk; scape bicarinate beneath, strongly punctate; first segment of flagellum slightly longer than it is wide at the apex, distinctly shorter than the second segment; antennal tubercles very distinctly separated; antennal scrobes distinctly carinate above, the carina most prominent midway between the antennal tubercles and the margins of the eyes; front strongly, contiguously punctate, the vertex and genae with the punctures more shallow and separated; distance between the margins of the eyes and postero-lateral angles of the head about equal to the greatest diameter of the eyes; relative widths of head and thorax, 5.25–5.25.

Thorax ferruginous, the dorsum dark, almost dark mahogany red, the sides bright ferruginous; clothed with erect and semirecumbent, silvery pubescence, except the mesonotum laterally with a few dark, erect hairs, the pubescence moderately dense on the pronotum, mesonotum, and scutellum, sparse on the sides of the thorax, and propodeum throughout; pronotum and mesonotum with large contiguous punctures, coarser toward the caudal margin of the mesonotum; scutellum coarsely punctate, similar to the caudal area of the mesonotum; anterior margin of scutellum produced forming a prominent angulation medially; cephalic margin of propleura obscurely carinate, the disk with large scattered punctures dorsally, indistinctly sculptured elsewhere; mesopleura with large, contiguous punctures throughout, except the narrow cephalic margin finely punctate; metapleura glabrous, impunctate, except for a few large punctures ventrally; sides of propodeum glabrous, impunctate anteriorly, coarsely foveate posteriorly; posterior face and dorsum of propodeum with large, deep reticulations, the latter largest medially; tegulae glabrous and impunctate except narrow basal and inner lateral margins setigerously punctate.

Abdomen ferruginous; first segment very strongly nodose; first tergite coarsely, deeply, confluently punctate posteriorly and laterally, anteriorly the punctures scattered, sparsely clothed with erect, silvery pubescence, no distinct apical fringe; second tergite with large, contiguous punctures throughout, sparsely clothed with erect pubescence, that on the anterior half silvery, on the posterior half dark, and with an apical fringe of silvery pubescence; tergites 3–6 strongly, very densely punctate; tergites 3 and 4 sparsely clothed with erect silvery pubescence, and each with an apical fringe of silvery pubescence; tergites 5 and 6 sparsely clothed with black pubescence and each with an apical fringe of black pubescence; pubescence at base of ultimate tergite silvery; first sternite with large, deep punctures, the usual median longitudinal carina indistinct, sparsely clothed with erect, silvery pubescence; second sternite with large, slightly elongate, distinct punctures, sparsely clothed with erect, silvery pubescence, except the lateral pubescence dark, apical fringe of silvery pubescence; apical margins of sternites 3–6 densely punctured; thin apical fringes of sternites 3 and 4 silvery, the fringes of sternites 5 and 6 black; ultimate sternite with strong, distinct punctures.

Legs dark mahogany red; sparsely clothed with silvery pubescence; apices of middle and posterior femora squarely truncate, the caudal surfaces of the truncation sulcate; calcaria pale.

Wings light fuliginous; cell 2nd R_1+R_2 broadly truncate at the apex; cell R_4 practically obsolete; vein M_{3+4} received by cell R_5 about one-third the distance between the base and the apex; veins r–m and R_5 distinctly separated on vein r.

Holotype.—Male, Tucson, Arizona (F. H. Snow), in collection of University of Kansas.

This species is closely related to *obscura* but may be easily distinguished by the color of the integument and of the pubescence and the pale calcaria. The genitalia are like those of *obscura* and are not figured. This may be the male of *heliophila* Cockerell.

118. DASYMUTILLA SOPHRONA, new species

Male.—Head and thorax black; abdomen ferruginous; head and pronotum clothed with somewhat dense silvery pubescence, the mesothorax and scutellum with darker pubescence; abdomen clothed with pale yellowish pubescence throughout; length 13.5 mm.

Head subquadrate, black, clothed throughout with somewhat dense, recumbent, silvery pubescence and scattered, erect, darker hairs; mandibles long, the basal two-thirds ferruginous, apical third black, acute at the apex, toothed within near the apex; clypeus very prominently bidentate medially on the cephalic margin, the disk densely punctate; scape with only one distinct carina beneath, above with strong, distinct punctures; first segment of flagellum two-fifths longer than it is wide at the apex, distinctly shorter than the second segment; antennal tubercles distinctly separated; antennal scrobes carinate above, the carina most prominent midway between the antennal tubercles and the margins of the eyes; front rugoso-punctate; vertex and genae with large, somewhat confluent punctures, not as coarsely sculptured as the front; distance between the posterior margins of the eyes and the postero-lateral angles of the head less than the greatest diameter of the eyes; relative widths of head and thorax, 7–8.

Thorax black; the pronotum with somewhat dense, recumbent, silvery pubescence, and with scattered, erect, pale hairs, the remainder of the thorax with sparse, erect, dark hairs, very sparse on the propodeum; cephalic surface of pronotum contiguously punctate above; pronotum with large, dense punctures, somewhat confluent;

mesonotum and scutellum with deep, dense punctures, the sculpture somewhat rugose; anterior margin of scutellum produced medially forming a prominent angulation; cephalic margin of propleura defined by a carina, the latter not extending dorsally to the humeral tubercle; propleura with large, contiguous punctures; mesopleura with coarse, distinct punctures throughout; metapleura glabrous, impunctate throughout, except for a few large punctures ventrally; anterior margin of sides of propodeum glabrous, impunctate, the remainder deeply and very coarsely reticulate; posterior face and dorsum of propodeum very deeply and coarsely reticulate; tegulae glabrous, impunctate, except the narrow basal, and inner lateral margins setigerourly punctate.

Abdomen ferruginous; first segment strongly nodose; first tergite very deeply, densely and coarsely punctate; sparsely clothed with long, erect, pale yellow pubescence and a thin apical fringe of pale yellow pubescence; second tergite deeply, densely, strongly punctate throughout, sparsely clothed with long, erect, pale yellow pubescence and an apical fringe of similar pubescence; tergites 3–6 densely. deeply, strongly punctate; apical fringe and sparse, long, erect pubescence pale yellow; basal area of ultimate tergite densely punctate and with pale yellow pubescence; the pygidial area concave, rugose; basal areas of integument of tergites 4, 5, and 6 somewhat darker than remainder of abdomen; first sternite dark, the median longitudinal carina prominent anteriorly, densely punctate, sparsely clothed with long, erect, pale yellow pubescence; second sternite with large, somewhat elongate, distinct punctures throughout; apical margins of sternites 3–6 densely punctate; sternites 2–6 with sparse, long, erect, pale yellow pubescence and with apical fringes of similar pubescence; ultimate sternite with moderate, distinct punctures, and sparse, pale yellow pubescence.

Legs dark mahogany red, clothed with sparse, dark pubsecence; apices of middle and posterior femora squarely truncate, the caudal surfaces of the truncations sulcate; calcaria pale.

Wings dark fuliginous; cell 2nd R_1+R_2 broadly truncate at the apex; cell R_4 practically obsolete; vein M_{3+4} received by cell R_5 about one-third the distance from the base to the apex; veins r–m and R_5 distinctly separated on vein r.

Holotype.—Male, Cat. No. 40749, U.S.N.M., Willcox, Arizona, July 31, 1909 (A. K. Fisher).

Paratype.—Male, Oak Creek Canyon, Arizona, August (F. H. Snow), in collection of University of Kansas.

The pale pubescence of the head, and the uniform coloration of the pubescence of the abdomen distinguish it from related species. The genitalia are like those of *obscura* and are not figured. This may be the male of either *dilucida* or *chrysocoma*. The paratype is much smaller than the type, its length being 7 mm.

119. DASYMUTILLA APICALATA (Blake)

Mutilla (*Sphaerophthalma*) *apicalata* BLAKE, Trans. Amer. Ent. Soc., vol. 3, p. 238, 1871, male.

Mutilla apicalata BLAKE, Trans. Amer. Ent. Soc., vol. 7, p. 244, 1879, male.—DALLE TORRE, Cat. Hymen., vol. 8, p. 10, 1897, male.—FOX, Trans. Amer. Ent. Soc., vol. 25, p. 245, 1899, male; Ent. News, vol. 11, p. 401, 1900, male.

Sphaerophthalma apicalata BLAKE, Trans. Amer. Ent. Soc., vol. 13, p. 230, 1886, male.—CAMERON, Biol. Centr.-Amer., Hymen., vol. 2, p. 374, 1896, male.

Ephuta (*Ephuta*) *apicalata* ANDRÉ, Gen. Ins., vol. 1, fasc. 11, p. 57, 1903, male.

Type.—Male, Mexico (F. Sumichrast), in collection of American entomological Society of Philadelphia.

Distribution.—Mexico, Texas.

SPECIMENS EXAMINED

TEXAS: Male.

The black pubescence of the mesonotum and the apical abdominal segments and the greatly developed, glabrous, lateral processes of the scutellum, distinguish it from related species. The type has been examined and this specimen found to be identical with it.

120. DASYMUTILLA DIGRESSA, new species

Male.—Head and thorax black, abdomen ferruginous; front vertex, pronotum, anterior margin of mesonotum and scutellum with silvery gray pubescence, remainder of head and thorax with black pubescence; apical fringe and pubescence of apical half of second abdominal tergite black, pubescence of remainder of abdomen pale; first segment of flagellum distinctly shorter than the second; lateral processes of scutellum small, punctate; middle and hind femora squarely truncate at the tip, the surface of the truncations sulcate; calcaria pale. Length, 11 mm.

Head black, clothed with sparse, long, erect, black pubescence, except the front and vertex with sparse, long, erect and appressed, silvery gray pubescence; mandables acute at the tip, apparently not dentate within; anterior margin of clypeus very strongly dentate medially; disk of clypeus densely, confluently punctuate; scape bicarinate beneath, one carina strong, the other very weak, punctate above; first segment of flagellum distinctly shorter than the second; antennal scrobes carinate above; front densely, confluently punctate; vertex densely but not confluently punctate; genae with moderate, more or less separated punctures; relative widths of head and thorax, 5.5–6.25.

Thorax black, clothed with sparse, long, erect, black pubescence, except the pronotum, propleura, anterior margin of mesonotum, scutellum and posterior face of propodeum with long, erect and appressed, silvery gray pubescence; anterior margin of pronotum not emarginate medially; pronotum, mesonotum, and scutellum coarsely, densely punctate; lateral processes of scutellum small, punctate; propleura with large, more or less contiguous punctures; mesopleura with large, close punctures; metapleura glabrous, impunctate, except the ventral third coarsely punctate; anterior half of sides of propodeum glabrous, impunctate, the posterior half, coarsely, foveately reticulate; posterior face and dorsum of propodeum coarsely, foveately reticulate; tegulae black, glabrous, impunctate, except the basal and inner lateral margins setigerously punctate.

Abdomen ferruginous, the basal half of the first segment blackish; clothed with sparse, long, erect, silvery gray pubescence, except the pubescence of apical half of the second tergite, and its apical fringe, black; first tergite coarsely, densely, confluently punctate; second tergite with large, distinct, contiguous punctures; tergites 3–6 densely, confluently punctate; pygidial area coarsely rugose; first sternite punctate, and with a median, longitudinal carina, prominently produced anteriorly; second sternite with large, elongate punctures, contiguous at the sides, more or less separated medially; sternites 3–6 densely punctate at the apical margin; last sternite closely punctate throughout.

Legs blackish, sparsely clothed with long, erect, pale and black pubescence intermixed; calcaria pale; middle and hind femora squarely truncate at the tip, the surface of the truncations sulcate.

Wing dark fuliginous; cell 2nd R_1+R_2 broadly truncate at the apex, cell R_4 indistinct; vein M_{3+4} received by cell R_5 at about one-third the distance from base to apex; veins r–m and R_5 widely separated on vein r.

Holotype.—Male, Pecos, New Mexico, July 26 (Cockerell), in collection of American Entomological Society of Philadelphia.

Digressa is closely related to *apicalata*, *sophrona*, *errabunda*, *snoworum*, and *obscura.* Superficially it has much the appearance of *apicalata.* It differs from the latter in the small, punctate, lateral processes of the scutellum, the first segment of the flagellum distinctly shorter than the second and in the color of the pubescence of the abdomen. The genitalia are similar to those of *obscura* and are therefore not figured.

121. DASYMUTILLA CURIALIS, new species

Male.—Head and thorax black, the vertex and pronotum clothed with sparse, long, erect, silvery gray pubescence, the remainder of head and thorax with sparse, long, erect, black pubescence; abdomen ferruginous, clothed throughout with sparse, long, erect, black pubescence intermixed with scattered pale erect hairs; first segment of flagellum subequal to the second; lateral processes of scutellum small and punctate; middle and hind femora squarely truncate at the tips, the surface of the truncations sulcate; calcaria pale. Length, 11 mm.

Head, black, clothed with sparse, long, erect, black pubescence, except the vertex with sparse, long, erect, silvery gray pubescence; mandibles acute at the apex, apparently very indistinctly dentate within; apical margin of clypeus very prominently bidentate medially; disk of clypeus densely, confluently punctate; scape bicarinate beneath, the one carina strong, prominent, the other weak, indistinct, closely punctate above; first segment of flagellum subequal in length to the second; antennal scrobes carinate above; front densely, confluently punctate; vertex closely punctate, somewhat less coarsely sculptured than the front; genae with moderate, separated punctures, less coarsely sculptured than the vertex; relative widths of head and thorax, 6.25–7.

Thorax black, clothed with sparse, long, black, erect pubescence, except the pronotum with sparse, long, erect, silvery gray pubescence; cephalic margin of pronotum not emarginate medially; pronotum, mesonotum and scutellum densely, confluently punctuate; propleura with large, contiguous punctures anteriorly and shallow, indistinct punctures posteriorly; mesopleura with large, contiguous punctures, except the punctures separated and sparse anteriorly; ventral third of metapleura coarsely, confluently punctuate, the dorsal two-thirds glabrous, impunctate; anterior half of sides of propodeum glabrous, impunctate, the posterior half and the posterior face and dorsum of the propodeum deeply, coarsely, foveately reticulate; tegulae glabrous, impunctate, except the basal and inner lateral margins setigerously punctate.

Abdomen ferruginous, except the first segment black, clothed with sparse, long, erect, black pubescence, intermixed with scattered, erect, pale hairs; first tergite coarsely, densely, confluently punctate; second tergite with large, coarse, contiguous punctures throughout; tergites 3–6 densely, confluently punctate; pygidium irregularly rugose; first sternite punctate and with a median, longitudinal carina, the latter most prominent anteriorly; second sternite with large, close punctures throughout; sternites 3–6 punctate at the apical margins; last sternite moderately punctate.

Legs black, clothed with long, sparse, blackish pubescence; middle and hind femora squarely truncate at the apex, the surface of the truncations sulcate; calcaria pale.

Wings dark fuliginous; cell 2nd R_1+R_2 broadly truncate at the apex, cell R_4 almost obsolete; vein M_{3+4} received by cell R_5 about one-fourth the distance from the base to the apex; veins r–m and R_5 widely separated on vein r.

Holotype.—Male, Jemez Springs, New Mexico, July 1, 1916 (John Woodgate), in collection of Cornell University.

This species looks very similar to *snoworum*, but differs from the latter in having the calcaria pale, the first segment of the flagellum subequal in length to the second, and the apical fringes of the abdominal segments black. It is a more robust species than *digressa* and can be separated from that species by the characters given in the key. The genitalia are like those of *obscura*, and are therefore not figured.

GROUP CREON

Females with the head wider than the thorax; thorax subhexagonal; scutellar scale present; pygidium pubescent. Males with the head scarcely as wide as the thorax; anterior margin of pronotum not emarginate medially; first segment of abdomen strongly nodose; pygidium pubescent; and posterior trochanters produced beneath into a prominent tooth.

122. DASYMUTILLA CREON (Blake)

Plate 4, fig. 33

Mutilla (Sphaerophthalma) creon BLAKE, Trans. Amer. Ent. Soc., vol. 4, p. 73, 1872, male.

Mutilla creon BLAKE, Trans. Amer. Ent. Soc., vol. 7, p. 244, 1879, male.—DALLE TORRE, Cat. Hymen., vol. 8, p. 28, 1897, male.—FOX, Trans. Amer. Ent. Soc., vol. 25, p. 246, 1899, male.—MELANDER, Trans. Amer. Ent. Soc., vol. 29, p. 302, 1903, male.

Sphaerophthalma creon BLAKE, Trans. Amer. Ent. Soc., vol. 13, p. 228, 1886, male.

Ephuta (Ephuta) creon ANDRÉ, Gen. Ins., vol. 1, fasc. 11, p. 59, 1903, male.

Type.—Male, Bosque County, Texas, in collection of American Entomological Society of Philadelphia.

Plesiotype.—Male, Eastland County, Texas, August 27, 1920 (Grace O. Wiley), in collection of University of Minnesota.

Distribution.—Texas.

SPECIMENS EXAMINED

TEXAS: Male, Pittsburg, July 28, 1904 (F. C. Bishopp).

This species and *eminentia* Mickel are very easily recognized by the prominent tooth on the trochanters of the posterior legs. They are not at all closely related, however. The genitalia are very dissimilar, the pygidial areas of the two are unlike and in other respects they show only distant relationships. The ferruginous color of the head, thorax and first two abdominal segments, and the pubescent pygidium are additional characters which serve to distinguish *creon*. *Bollii* Fox is almost without question the female of this species. It inhabits the same region, and has the pygidium pubescent in the same manner as *creon*.

123. DASYMUTILLA BOLLII (Fox)

Mutilla bollii Fox, Trans. Amer. Ent. Soc., vol. 25, p. 242, 1899, female.
Ephuta (*Ephuta*) *bollii* André, Gen. Ins., vol. 1, fasc. 11, p. 58, 1903, female.
Mutilla bollii Melander, Trans. Amer. Ent. Soc., vol. 29, p. 301, 1903, female.
Dasymutilla blawana Rohwer, Proc. U. S. Nat. Mus., vol. 41, p. 461, 1912, female.—Rau, Trans. Acad. Sci. St. Louis, vol. 24, no. 7, p. 6, 1922, female.

Type.—Female, Dallas, Texas (Boll), in collection of American Entomological Society of Philadelphia. The type of *blawana* is in the United States National Museum.

Distribution.—Mississippi, Louisiana, Texas, Oklahoma, and Kansas.

SPECIMENS EXAMINED

Kansas: Female, Neosho County, June 13, 1919 (Grace O. Wiley); female, Labette County (R. H. Beamer).

Louisiana: Female, Gilliam, September 6, 1907 (F. C. Bishopp).

Mississippi: Female, Agricultural College, April 7, 1922 (M. D. Woodbury); female, Agricultural College, July 15, 1914 (C. C. Greer); female, Agricultural College, October 23, 1917 (F. H. Jones).

Oklahoma: Female, Payne County, June 24, 1925 (W. J. Brown); female. Payne County, July 5, 1925 (W. J. Brown); female, Payne County, July 9, 1925 (W. J. Brown); female, Payne County, September 5, 1923 (W. J. Brown); female, Payne County, September 8, 1923 (W. J. Brown).

Texas: Female, Victoria, June 27, 1906 (W. E. Hinds); female, Richmond, June 22, 1917; female, Beaumont, August 10, 1917 (E. L. Diven); female, Cuero (Townsend); female, Navasota, August 14, 1915 (H.); female, Calvert, October 25, 1903 (A. W. Morrill); female, Calvert, April 5 (C. R. Jones); female, Calvert (G. H. Harris); 2 females, Fedor, August, 1905; female, Fedor; female, Lee County, June, 1905; female, Lee County, August, 1905; female, Cameron, August 9, 1906 (J. C. Crawford); female, Willow City, May 26, 1906 (F. C. Pratt); female, Rosser, September 23, 1905 (C. R. Jones); female, Overton, August 22, 1907 (W. W. Yothers); female, Rock Island, July 25, 1922 (Grace O. Wiley); female, Eastland County, May 31, 1921 (Grace O. Wiley); female, Sulphur Springs, October 4, 1904 (F. C. Bishopp); female, Paris; 2 females (Belfrage); 4 females.

The type of this species has been examined and found to be identical with the above specimens. The species is readily recognized by the presence of pubescence on the pygidial area. The length varies from 8 mm. to 13 mm. I have examined the type of *blawana* Rohwer and find it to be the same as this species.

Group ARENIVAGA

Females with the head narrower than the thorax; eyes unusually large, the distance between the eye margins and the postero-lateral angles of the head not equal to one-third the greatest diameter of the eyes; thorax longer than broad, subhexagonal; scutellar scale prominent; pygidium longitudinally rugose. Males unknown; may be represented by the following group.

124. DASYMUTILLA ARENIVAGA, new species

Female.—Black, the vertex, thorax above, and second abdominal tergite, except the apical fringe, with long, dense, erect, yellow pubescence; eyes unusually large. Length, 12 mm.

Head very dark mahogany red; mandibles acute at the apex, unidentate within about one-third their length from the apex; clypeus feebly bidentate medially on the apical margin; clypeal fringe of long, black pubescence; scape punctured, sparsely clothed with coarse black hairs; first segment of flagellum twice its own width at the apex; antennal scrobes strongly carinate above; front shallowly and confluently foveate, clothed with erect and recumbent black pubescence; the vertex with shallow, more or less confluent punctures, clothed with erect and recumbent yellow pubescence; genae with shallow, separated punctures, not nearly as coarsely sculptured as the front, sparsely clothed with black pubescence; eyes very large, the distance between the eye margins and the postero-lateral angles of the head not greater than one-third the greatest diameter of the eyes; relative widths of head and thorax, 8–9.

Thorax black; the dorsum closely foveate, clothed with long, dense, erect and recumbent yellow pubescence; propleura with large, close punctures anteriorly, small punctures posteriorly, sparsely clothed with black pubescence; anterior half of mesopleura indistinctly punctured, sparsely clothed with long, black pubescence; posterior half of mesopleura confluently foveate anteriorly, indistinctly punctate posteriorly, clothed with long, black pubescence; dorsal half of metapleura impunctate, the ventral half irregularly punctate, clothed with long, sparse, black pubescence; anterior half of sides of propodeum with scattered punctures, the posterior half closely foveate, sparsely clothed with black pubescence, and a little scattered yellow pubescence dorsally; posterior face of propodeum closely and deeply foveate, except the ventral median area indistinctly punctate; the dorsal half of the posterior face of the propodeum, and the dorsum of the propodeum with long, dense, erect, yellow pubescence; scutellar scale very prominent.

Abdomen black; the first segment short, subsessile; disk of first tergite impunctate, the sides and posterior margin closely, shallowly punctate, sparsely clothed with long, erect, black pubescence; second tergite closely foveate at the base and sides, and with large, usually separated punctures on the disk, clothed with long, dense, erect and recumbent yellow pubescence, except the pubescence of the sides, and the apical fringe black; the apical margin of the second tergite slightly depressed, especially at the sides; tergites 3–5 with shallow, indistinct punctures, clothed with long, dense, erect, black pubescence; pygidial area longitudinally rugose; first sternite with a sharp median longitudinal keel on the anterior half; lateral margins of second sternite foveate, more strongly so towards the posterior margin, the anterior half of the sternite indistinctly punctured, the disk of the posterior half with large, separated punctures; apical margin of second sternite depressed; sternites 3–5 with shallow, more or less confluent punctures; sternites 2–5 with a thick fringe of long, black pubescence.

Legs black, clothed with long, black hairs.

Holotype.—Female, Coyote Wells, Colorado Desert, California, August 11, 1914 (J. C. Bradley), in collection of Cornell University, No. 760.1.

Paratypes.—3 females, Wellton, Yuma County, Arizona, August 9, 1917 (J. Bequaert); female, Yuma, Arizona, summer, 1900 (H. Brown); female, Yuma, Arizona, 1901 (H. Brown); 2 females, Death Valley, California, April, 1891; female, Panamint Valley, California, April, 1891; female, Imperial County, California, 1913 (Essig). Paratypes in collections of United States National Museum, University of Minnesota, J. Bequaert, California State Insectary, and the author.

This species is almost identical with *scitula* in superficial appearance. The very large eyes, sculpture of the genae and pygidium and the more extended yellow pubescence of the second abdominal tergite serve to distinguish it from that species. The shape of the head in this species is quite different from that in *scitula* due to the great development in the size of the eyes. *Arenivaga* is a manuscript name of Dr. J. C. Bradley.

125. DASYMUTILLA NOCTURNA, new species

Female.—Very dark mahogany red, almost black; eyes unusually large; front, vertex, thorax above and second tergite of abdomen clothed with long, white pubescence; remainder with black pubescence; length, 13 mm.

Head very dark mahogany red; mandibles acuminate at the apex, probably unidentate within but mandibles are worn so that this is not apparent; clypeus bidentate medially on the apical margin, with a thick fringe of long, dark hairs; scape sparsely clothed with coarse dark hairs; first segment of flagellum slightly shorter than twice its own width at the apex; antennal scrobes strongly carinate above; eyes unusually large and prominent, the distance between the eye margins and the postero-lateral angles of the head not greater than one-third the diameter of the eyes; front and vertex with large, shallow, more or less confluent punctures, clothed with long, white, erect, and recumbent pubescence; genae with separated, moderate, shallow punctures, clothed with sparse, black pubescence; relative widths of head and thorax, 9.5–13.

Thorax very dark, mahogany red, as broad as long; dorsum of thorax with very large, deep and coarse punctures, clothed with long, erect and recumbent white pubescence; scutellar scale prominent; propleura with shallow, indistinct punctures; very sparsely clothed with dark pubescence; anterior half of mesopleura glabrous, indistinctly punctured, clothed with sparse, dark pubescence; posterior half of mesopleura coarsely punctured, with a longitudinal row of long, black hairs; metapleura glabrous, with a few scattered punctures ventrally, sparsely clothed with dark hairs; sides of propodeum with shallow, indistinct punctures, sparsely clothed with dark pubescence; posterior face of propodeum coarsely and deeply reticulate; dorsum and dorsal half of posterior face of propodeum with long, erect white pubescence; the ventral half of the posterior face with long, erect black pubescence.

Abdomen very dark mahogany red; first tergite glabrous, a few large, shallow punctures at the sides, small confluent punctures on the apical margin, with a transverse, subapical row of long, erect black hairs; second tergite with close, coarse, deep punctures, clothed with long, erect, white pubescence, except the basal lateral angles with sparse, dark pubescence, and a thick, apical fringe of black pubescence; tergites 3–5 with small, very indistinct punctures, clothed with erect, black pubescence; pygidium distinctly longitudinally rugose; first sternite with a distinct median carina; second sternite with large, more or less confluent punctures, sparsely clothed with black pubescence, and a thick apical fringe of black pubescence; sternites 3–5 indistinctly punctate, each with a thick fringe of long, black pubescence.

Legs very dark mahogany red, clothed with long, black pubescence.

Holotype.—Female, Andrade, California, Colorado Sand Desert. August 10, 1917 (J. Bequaert), in collection of University of Minnesota.

Paratype.—Female, Brawley, Imperial County, California, August 9, 1914 (J. C. Bradley), in collection of Cornell University.

This species is quite remarkable in appearance with its contrasting coat of white and black pubescence. It is also remarkable from the fact that the type was collected at light at about 11 o'clock at night. There is no record of any other female *Dasymutilla* being collected at lights. The eyes of this and the preceding species are much larger and more prominent than those of the other members of the genus. *Nocturna* is similar to *arenivaga* in general color pattern but differs in the color of the pubescence, in the relative widths of head and thorax, and other characters.

Group SUBHYALINA

Males with the eyes and ocelli unusually large; anterior margin of pronotum emarginate medially; first segment of the abdomen nodose; second abdominal sternite without a median pit densely filled with hairs; wings light fuliginous to subhyaline. Possibly the males of the species in the preceding group.

126. DASYMUTILLA SUBHYALINA, new species

Plate 4, fig. 31

Male.—Black, with long, white pubescence on the head, thorax and abdomen; eyes and ocelli abnormally large; wings subhyaline; length, 10 mm.

Head black; mandibles acuminate at the apex, bidentate within subapically, clypeus bidentate on the apical margin, with small confluent punctures; scape clothed with sparse, dark, coarse hairs; first segment of flagellum slightly shorter than the second; antennal scrobes distinctly carinate above; eyes abnormally large and prominent, occupying the whole side of the head; ocelli abnormally large and prominent, about twice the usual size; front with moderate deep, confluent punctures; the vertex and genae with shallow, separated punctures; front and vertex sparsely clothed with long, white, erect pubescence; genae sparsely clothed with black pubescence; relative widths of head and thorax, 6–7.

Thorax black, pronotum, mesonotum, and scutellum with moderate, close, confluent punctures; the pronotum, mesonotum, scutellum, and metanotum clothed with long, white, erect pubescence; propleura with scattered punctures, clothed with sparse black pubescence; mesopleura with large, shallow, more or less confluent punctures, rather sparsely punctate near the anterior margin, sparsely clothed with black pubescence; metapleura glabrous, a few scattered punctures ventrally, very sparsely clothed with black pubescence; propodeum broadly and deeply reticulate throughout; tegulae glabrous, scattered punctures along the basal and inner lateral margins, these same margins with sparse, white pubescence.

Abdomen black; first segment distinctly nodose; first tergite with coarse, confluent punctures, clothed with sparse, erect, black pubescence; second tergite coarsely, confluently punctate throughout, clothed with erect, black pubescence, except the apical fifth clothed with long, erect, white pubescence; tergites 3–6 with small, separated punctures, clothed with long, erect, white pubescence; last tergite with a fringe of long, white pubescence at the base, otherwise bare, finely longitudinally rugose; first sternite with a distinct median carina; second sternite with large, shallow, elongate punctures, sparsely clothed with black pubescence and with an apical fringe of pale hairs slightly interrupted medially with a few dark hairs; sternites 3–6 indistinctly punctate, sparsely clothed with black pubescence, the apical fringes black except for a few white hairs laterally; apical sternite indistinctly punctate, clothed with sparse black pubescence.

Legs black, clothed with long, black pubescence.

Wings subhyaline, cell R_4 present but rather indistinct; veins r–m and R_5 separated on vein r.

Holotype.—Male, Andrade, California, Colorado Sand Desert, August 10, 1917 (J. Bequaert), in collection of University of Minnesota.

Paratype.—Male, Andrade, California, Colorado Sand Desert, August 10, 1917 (J. Bequaert), in collection of J. Bequaert.

This is possibly the male of *nocturna.* It was collected at light at 11 o'clock at night the same as the latter. As there is no other evidence for uniting them as male and female of the same species other than that they were collected at the same time and place, it seems best to describe them as two species. *D. subhyalina* is quite remarkable on account of the abnormally large eyes and ocelli. Large ocelli are the rule in the genus *Photopsis*, but this species has none of the other characters of that genus and is obviously a *Dasymutilla.* It may also be distinguished by the subhyaline wings which is unusual in males of this genus.

127. DASYMUTILLA MEGALOPHTHALMA, new species

Male.—Dark mahogany red, almost black; dorsum of thorax and abdominal tergites from apical margin of the second densely clothed with long, erect, yellow pubescence. Eyes abnormally large and prominent, entirely covering the sides of the head; ocelli abnormally large, from two to three times the normal size; wings light fuliginous; length, 11 mm.

Head dark mahogany red, almost black; sparsely clothed with long, erect, black pubescence, except a few scattered yellow hairs on the vertex; mandibles acute at the apex, bidentate within subapically; apical margin of clypeus bidentate medially; clypeus densely punctate; scape bicarinate beneath, closely punctured; first segment of flagellum distinctly shorter than the second (measured dorsally); antennal scrobes strongly carinate above; front coarsely, confluently punctate; vertex and genae with indistinct, shallow, separated punctures; eyes abnormally large, entirely covering the sides of the head, almost touching the base of the mandibles; ocelli abnormally large; two to three times as large as usual; relative widths of head and thorax, 6.75–8.

Thorax dark mahogany red, almost black; pronotum, mesonotum, scutellum, and metanotum with long, erect, dense, yellow pubescence, the remainder of the thorax with sparse, long, erect, black pubescence; cephalic face of pronotum punctate laterally, glabrous, impunctate, emarginate medially, not rounded evenly into the dorsum medially; dorsum of pronotum, mesonotum, and scutellum densely, coarsely punctate; narrow basal and lateral margins of tegulae setigerously punctate, for the most part glabrous, impunctate; propleura with scattered, indistinct punctures; mesopleura with scattered, large punctures near the anterior margin, elsewhere with deep, coarse contiguous punctures; metapleura glabrous, with fine, indistinct, scattered punctures, and a few, large punctures ventrally; sides of propodeum glabrous, impunctate at the anterior margin, irregularly, broadly reticulate elsewhere; posterior face and dorsum of propodeum coarsely, foveately reticulate.

Abdomen dark mahogany red, almost black; apical margin of second tergite, tergites 3–6 and base of ultimate tergite, all with long, erect, dense, yellow pubescence; remainder of abdomen with long, sparse, erect, black pubescence; apical fringes of sternites black; first segment nodose; first tergite coarsely, confluently punctate; second tergite with large, dense, more or less confluent punctures throughout, closer and more confluent anteriorly than posteriorly; tergites 3–6 densely punctate; pygidial area irregularly rugose; first sternite with large, indistinct punctures, the median carina prominent, produced slightly both anteriorly and posteriorly; second sternite with large, shallow, elongate, more or less confluent punctures throughout; sternites 3–6 with small, scattered punctures near the apical margin; ultimate sternite distinctly punctate.

Legs dark mahogany red, sparsely clothed with long, black pubescence; calcaria black.

Wings fuliginous; cell 2nd R_1+R_2 broadly truncate at the apex; cell R_4 almost obsolete; vein M_{3+4} received by cell R_5 at one-third the distance from the base to the apex; veins r–m and R_5 approximate, but not touching on vein r; vein r–m long and sinuate.

Holotype.—Male, Yuma County, Arizona, September, 1903, in collection of American Museum of Natural History.

Paratype.—Male, Yuma County, Arizona, September, 1903; male, Cochise County, August. Paratypes in collections of American Museum of Natural History and University of Minnesota.

Closely related and similar to *subhyalina.* Both have the characteristic large eyes and ocelli. Differs from *subhyalina* in the light fuliginous wings and in the yellow pubescence of the thorax and abdomen. The genitalia are identical with those of *subhyalina* and are therefore not figured.

The four following species are known only in the male sex and their relationships are obscure. They do not represent a natural group and are placed here only as a matter of convenience. All four have a median pit densely filled with hairs on the second abdominal sternite.

128. DASYMUTILLA CHISOS, new species

Plate 4, fig. 32

Male.—Head and thorax black; abdomen fulvous from apex of second tergite. Length, 13 mm.

Head black, clothed with long, erect, and semierect black hairs; mandibles tridentate; clypeus feebly bidentate at the apex medially, very closely punctate on the apical half; scape shining, sparsely punctate and clothed with coarse hair; first segment of flagellum distinctly shorter than the second; antennal scrobes distinctly carinate above; front coarsely sculptured; the punctures large, deep, and confluent; vertex not coarsely sculptured, the punctures shallow and separated; genae with small shallow, more or less confluent punctures; relative widths of head and thorax, 6.25–7.

Thorax black, clothed with long, erect and semierect black hairs; prothorax, mesothorax, scutellum, and metanotum very coarsely sculptured, the punctures very large, deep, and confluent; pronotum shallowly emarginate medially on the cephalic margin, the face of the emargination shining, impunctate, and produced above on each side of the median line forming two short, rounded teeth; propleura punctate throughout; mesopleura with scattered, small punctures on the anterior third, large, close punctures on the posterior two-thirds; metapleura impunctate, shining, except for a few scattered punctures ventrally; sides of propodeum smooth and shining on anterior half, coarsely reticulate on the posterior half; dorsum and posterior face of the propodeum broadly and deeply reticulate; tegulae smooth, shining, impunctate, except for a few punctures at the extreme basal margin.

Abdomen black; first segment subnodose, the ventral carina produced anteriorly into a tooth; basal two-thirds of first tergite shining, with a few irregular punctures, apical third closely confluently punctate, clothed with long, erect, black hairs; second tergite punctate throughout, the punctures on the disk deep, well separated, those at the base and margins close and confluent, clothed with black hairs, except at the apical margin with a wide fringe of fulvous pubescence; tergites 3–6 deeply and distinctly punctate, clothed with long, fulvous pubescence; apical tergite smooth and shining, with a narrow fringe of long, fulvous pubescence at the basal margin; second sternite with well separated, coarse, elongate punctures, except at the apical margin the punctures small and confluent, a large pit densely filled with fine hairs occupying the median area; sternites 3–6 punctate at the apical margins; sternites 2–6 with a fringe of long pubescence at the apical margins, the fringes black except for a few long, fulvous hairs on the lateral part of each margin; last sternite irregularly punctate on the basal two-thirds, the apical third smooth and shining, prolonged medially into a prominent tooth.

Legs black, clothed with long black hairs.

Wings dark fulignous; veins r–m and R_5 approximate on vein r.

Holotype.—Male, Cat. No. 40751, U.S.N.M., Chisos Mountains, Brewster County, Texas, June 10–12, 1908 (Mitchell and Cushman).

Paratypes.—Male, Chisos Mountains, Brewster County, Texas, June 10–12, 1908 (Mitchell and Cushman); male, Torreon, Coahuila, Mexico (Wickham); male, Langtry, Texas, May 17, 1918 (J. C. Bradley). Paratypes in collections of the University of Minnesota, Cornell University, and the author.

This species may be recognized at once by the following characters: Second abdominal sternite with a large median pit; pronotum emarginate medially on the cephalic margin; last tergite without an apical fringe of hairs; and fulvous pubescence of second tergite covering only the apical margin.

129. DASYMUTILLA POLIOTHRIX, new species

Plate 4, fig. 29

Male.—Head and thorax black, clothed with silvery gray pubescence, except the mesonotum with very dark ferruginous, almost blackish pubescence; abdomen pale ferruginous, except the first segment very dark ferruginous, clothed throughout with golden yellow pubescence; second abdominal sternite with a median pit filled with hairs; legs dark, clothed with grayish pubescence. Length, 9 mm.

Head black, clothed throughout with erect and appressed, silvery gray pubescence; mandibles acute at the apex, apparently unidentate within near the apex; clypeus feebly bidentate medially at the anterior margin; disk of clypeus densely punctate; bases of mandibles and clypeus throughout clothed with long, silvery gray pubescence; scape distinctly bicarinate beneath, strongly and closely punctured above; flagellum black above, ferruginous beneath; first segment of flagellum about three-fourths the length of the second; antennal scrobes carinate above; front with large, contiguous punctures; the vertex with similar, separated punctures; genae with moderate, close punctures; vertex somewhat gibbous medially between the ocelli and hind margin of the head; relative widths of head and thorax, 5–5.75.

Thorax black, clothed throughout with sparse, silvery gray pubescence, except the mesonotum with very dark ferruginous, almost blackish pubescence, that on the pronotum and mesonotum denser than elsewhere; anterior margin of pronotum emarginate medially, the face of the emargination glabrous, remainder of anterior face of pronotum punctate and finely pubescent; pronotum, mesonotum, and scutellum with large, coarse, confluent punctures; propleura with large, contiguous punctures except a median area on the posterior half with fine punctures; anterior margin of mesopleura with small, close punctures, the remainder of mesopleura with large, coarse, confluent punctures; metapleura glabrous, impunctate, except for a few large punctures ventrally; anterior half of sides of propodeum glabrous, with a few scattered punctures; the posterior half of sides of propodeum and posterior face of propodeum coarsely, foveately reticulate, the fovea on the posterior face considerably larger than those on the sides; tegulae glabrous impunctate, except the cephalic and inner lateral margins setigerously punctate.

Abdomen pale ferruginous, except the first segment dark ferruginous, almost black, clothed throughout with sparse, erect, pale golden yellow pubescence; the second to fifth segments with a thick fringe of pale golden yellow pubescence at the apical margins; first tergite coarsely, confluently punctate throughout; second tergite with large, close, elongate punctures, the latter somewhat denser at the margins; tergites 3–6 with dense, small punctures; last tergite impunctate, glabrous, without a fringe of hairs at the apical margin; first sternite punctate and with a median longitudinal carina, the latter somewhat more prominent anteriorly than posteriorly; second sternite with a large median pit densely filled with erect hairs, and with large, close punctures throughout; sternites 3–6 with small, scattered punctures near the apical margin; apical sternite with small, distinct punctures on the basal two-thirds, the apical third impunctate.

Legs dark ferruginous, sparsely clothed with pale pubescence; calcaria dark ferruginous.

Wings dark fuliginous; cell 2nd R_1+R_2 broadly truncate at the apex; cell R_4 almost obsolete; vein M_{3+4} received by cell R_5 at a point about one-fifth the distance between the base and apex; veins r–m and R_5 separated on vein r.

Holotype.—Male, Nogales, Arizona, July 24, 1903 (Oslar), in collection of Cornell University, No. 759.1.

Superficially this species resembles *intermixta*, but is smaller, has the abdomen entirely pale ferruginous except the first segment, while in *intermixta* the apical segments of the abdomen are black. The genitalia of the two species also indicate that they are not closely related. I have used the manuscript name suggested by Dr. J. C. Bradley, who first recognized this species as new.

130. DASYMUTILLA REPERTICIA, new species

Plate 4, fig. 34

Male.—Black; vertex, pronotum, mesonotum, scutellum, apical third of second abdominal tergite, tergites 3–7, sternites 3–6 laterally, all with yellow pubescence, the remainder of the body with black pubescence; second sternite with a very large, deep, median pit, densely filled with hairs; length, 10 mm.

Head black; front and vertex with scattered, long, erect, yellow pubescence, the remainder of the head with sparse, long, erect, black pubescence; mandibles acute at the tip, bidentate within subapically; anterior margin of clypeus not noticeably bidentate medially; clypeus densely, confluently punctate; scape bicarinate beneath, densely punctured and clothed with coarse, erect, black hairs; first segment of flagellum slightly shorter than the second (measured dorsally); antennal scrobes strongly carinate above; front coarsely, confluently punctate; vertex with shallow, indistinct punctures; genae with sparse, small punctures, not nearly as coarsely sculptured as the front; posterior margin of vertex excavated laterally; relative widths of head and thorax, 7–9.

Thorax black; pronotum, mesonotum and scutellum clothed with long, semi-appressed, yellow pubescence, the remainder of the thorax clothed with sparse, long, erect, black pubescence; cephalic face of pronotum punctate at the sides, glabrous, impunctate and distinctly emarginate medially, not rounded evenly into the dorsum; pronotum, mesonotum, and scutellum very coarsely, confluently, almost foveately punctate; narrow basal and lateral margins of tegulae setigerously punctate, the hairs yellow; the tegulae for the most part glabrous, impunctate; propleura with large punctures at the margins, finely punctate medially, mesopleura with large, scattered punctures anteriorly, posteriorly with the punctures foveate, contiguous, somewhat confluent; metapleura, glabrous, impunctate, except for scattered large punctures ventrally; sides of propodeum glabrous, not sculptured anteriorly, foveately reticulate posteriorly; posterior face and dorsum of propodeum deeply, foveately reticulate.

Abdomen black, apical half of second tergite, tergites 3–6, base of ultimate tergite, and apical fringes of sternites 3–6 laterally, clothed with yellow pubescence; remainder of abdomen with sparse, long, erect, black pubescence; first segment nodose; first tergite coarsely, confluently punctate posteriorly, with large, scattered punctures anteriorly; second tergite densely punctate, except the disk with the punctures separated, distinct; tergites 3–6 densely punctate; basal margin of ultimate tergite punctate and pubescent, the sides and apex of the segment reflexed; apical margin of pygidium without a fringe of hairs; pygidium rugose; carina of first sternite prominent, somewhat produced, dentiform posteriorly, the sternite coarsely punctured; second sternite with large, distinct, scattered punctures, the latter somewhat closer laterally, and dense and contiguous at the apical margin; a very large, median pit densely filled with hairs on the second sternite; sternites 3–6 with small, scattered punctures near the apical margin; ultimate sternite punctate and pubescent.

Legs dark mahogany red, sparsely clothed with long, black pubescence; calcaria black.

Wings dark fuliginous; cell 2nd R_1+R_2 broadly truncate at the apex, cell R_4 almost obsolete; vein M_{3+4} received by cell R_5 at one-fourth the distance between the base and the apex; veins r–m and R_5 separated on vein r.

Holotype.—Male, Empire Mountains, Arizona, July 3, 1924 (A. A. Nichol), in collection of University of Minnesota.

Paratypes.—Male, Empire Mountains, Arizona, July 3, 1924 (A. A. Nichol); male, Tucson, Arizona, June 3, 1903 (Oslar); male, Tucson, Arizona, June 6, 1903 (Oslar); male, Tucson, Arizona, July 11, 1920; male, Catalina Mountains, Arizona, June 13, 1903 (Oslar); male, Catalina Mountains, Arizona, June 14, 1903 (Oslar); male, Patagonia Mountains, May 15, 1903 (Oslar); male, Oracle, Arizona, June 11, 1903 (Oslar); male, Congress Junction, Arizona, July (F. H. Snow); male, Florence, Arizona (Biederman); male, Comobabi Mountains, Arizona, August 9–10, 1916; 2 males, Yuma County, Arizona, September, 1903; male, Arizona; 2 males, specimens without data, 4 males, Steins, New Mexico, July 14, 1917 (H. H. Knight). Paratypes in collections of University of Minnesota, American Museum of Natural History; American Entomological Society, University of Kansas, University of Arizona, Cornell University, H. H. Knight, and the author.

Superficially this species appears much like *fulvohirta* but is quite different from that species in the form of the first segment of the abdomen, the median pit of the second sternite, and other characters. It comes near *sackenii* in the key, but may be distinguished from that species by the shorter and much less shaggy pubescence, the apical half of the second tergite clothed with fulvous pubescence and its smaller size. The paratypes vary in length from 8.5 to 12 mm., and the color of the pubescence varies from yellow to fulvous.

131. DASYMUTILLA SERENITAS, new species

Plate 4, fig. 35

Male.—Black, a very large, transverse, yellow spot covering most of the apical half of the second abdominal tergite; abdomen clothed above with pale yellow pubescence posterior to the middle of tergite 2; second sternite with a small median pit, densely filled with hairs; length, 10 mm.

Head entirely black, clothed throughout with sparse, long, erect, black pubescence; mandibles acute at the apex (dentition within worn, not determinable); anterior margin of clypeus distinctly bidentate medially; clypeus densely punctate; scape with a single distinct carina beneath, densely punctured; first segment of flagellum slightly shorter than the second (measured dorsally); antennal scrobes not carinate above; front with large, more or less confluent punctures; vertex with large contiguous punctures, vertex distinctly depressed laterally at the posterior margin; genae with small, separated punctures, not nearly as coarsely sculptured as the front; relative widths of head and thorax, 5.25–5.75.

Thorax entirely black, clothed throughout with sparse, long, erect, black pubescence, cephalic face of pronotum somewhat punctate laterally, glabrous, impunctate, and slightly emarginate medially, not rounding evenly into the dorsum; pronotum, mesonotum, and scutellum densely, coarsely punctate; tegulae somewhat setigerously punctate at the basal margin, and laterally at the base, for the most part glabrous, impunctate; propleura densely punctate dorsally, finely punctate medially, indistinctly sculptured elsewhere; mesopleura with large, separated punctures, interspersed anteriorly with fine punctures; metapleura glabrous, impunctate, except for a few, large, scattered punctures ventrally; sides of propodeum glabrous, a few, scattered obscure punctures anteriorly, and with large, coarse punctures along the posterior margin; posterior face and dorsum of propodeum coarsely, foveately punctured.

Abdomen black, a very large, transverse, yellow spot covering most of the apical half of the second abdominal tergite; clothed with long, erect, sparse, black pubescence, except tergites from middle of the second with long, erect, pale yellow pubescence; apical fringes of first tergite and all the sternites black, of tergites 2–6, pale yellow; first segment strongly nodose; first tergite coarsely, densely punctured except the disk anteriorly with scattered punctures; second tergite with moderate, separated, elongate punctures; tergites 3–6 with small, dense punctures, ultimate tergite punctate basally, the pygidial area irregularly rugose, the apical margin without a fringe of short, erect, hairs; longitudinal carina of first sternite not prominent nor dentate, the sternite indistinctly, coarsely punctured; second sternite with large, distinct punctures, sparser on the disk than elsewhere, and a small median pit filled with hairs, slightly anterior to the transverse median line; sternites 3–6 with small, scattered punctures at the apical margin; ultimate sternite with small, scattered punctures.

Legs black, sparsely clothed with black pubescence; calcaria black.

Wings dark fuliginous; cell 2nd R_1+R_2 broadly truncate at the apex; cell R_4 almost obsolete; vein M_{3+4} received by cell R_5 about one-third the distance from the base to the apex; veins r–m and R_5 widely separated on vein r; vein r–m sinuate.

Holotype.—Male, Eastland County, Texas, June 3, 1921 (Grace O. Wiley), in collection of University of Minnesota.

Paratypes.—Male, Eastland County, Texas, June 6, 1921 (Grace O. Wiley); male, Cotulla, Texas, May 12, 1906 (J. C. Crawford), in collections of University of Minnesota and United States National Museum.

The large, transverse, yellow spot on the apical half of the second tergite, and the pale yellow pubescence of the abdomen above are characteristic of this species.

The two following species are closely related and are known only in the male sex. The second abdominal sternite of both has a median area of fine, close punctures.

132. DASYMUTILLA ATRIFULVA, new species

Plate 5, fig. 36

Male.—Head and thorax black, abdomen red; second abdominal sternite with a median area of fine, close punctures. Length, 12 mm.

Head black, clothed with long, erect, and semierect pubescence; mandibles tridentate; clypeus bidentate medially at the apical margin, closely and confluently punctate on the apical half; scape bicarinate beneath, closely punctate and clothed with coarse hairs; first segment of flagellum about equal in length to the second; antennal scrobes strongly carinate above; front coarsely rugoso-punctate; vertex closely, more or less confluently punctate; genae closely punctate, the punctures smaller than on the vertex; relative widths of head and thorax, 6–7.

Thorax black, clothed with long, black, erect, and semierect pubescence; pronotum, mesonotum, scutellum, and metanotum closely and coarsely punctate, the pronotum especially so at the sides; propleura closely punctate at the margins, sparsely punctate medially; mesopleura with separated punctures on the anterior half, closely punctured on the posterior half; metapleura shining impunctate, except for a few large punctures ventrally; sides of propodeum shallowly, irregularly reticulate; dorsum and posterior face of propodeum deeply, irregularly reticulate; tegulae shining, impunctate.

Abdomen red; first segment very dark red, almost black, very closely and confluently punctate above, sparsely clothed with long, black, erect pubescence; second tergite very dark red on the basal and lateral margins, orange red on the disk; closely, confluently punctate on the basal and lateral margins, with distinct, separated punctures on the disk, clothed with long, erect fulvous pubescence on the apical four-fifths, that on the basal fifth black; tergites 3–6 orange red, with distinct separate punctures, and long, erect, fulvous pubescence; seventh tergite bare, with a raised median ridge, obscurely, irregularly, longitudinally rugose; second sternite very dark red, almost black, with large, separated punctures, except for a small median area which is finely, closely punctate, each puncture bearing a fine hair; sternites 3–6 orange red, irregularly punctate, with an apical fringe of fulvous hairs.

Legs black, sparsely clothed with black hairs.

Wings dark fuliginous; cell 2nd R_1+R_2 broadly truncate at the apex; cell R_4 less distinct than other cells of the wing; vein M_{3+4} received by cell R_5 at one-third the distance between the base and apex of the latter, veins r–m and R_5 approximate on vein r.

Holotype.—Male, Dragoon, Cochise County, Arizona, July 20, 1917 (J. Bequaert), in collection of University of Minnesota

PARATYPE MATERIAL

Seven males, Dragoon, Cochise County, Arizona, July 20, 1917 (J. Bequaert); 2 males, Douglas, Arizona, August (F. H. Snow); male, Nogales, Arizona, June 27, 1903 (Oslar); male, Nogales, Arizona, July 8, 1903 (Oslar); male, Nogales, Arizona, July 20, 1903 (Oslar); 2 males, Nogales, Arizona, July 23, 1903 (Oslar); male, Nogales, Arizona, July 30, 1903 (Oslar); 3 males, Nogales, Arizona, July 31, 1903 (Oslar); 3 males, Baboquivaria Mountains, Arizona (F. H. Snow); male, Sabino Canyon, St. Catalina Mountains, Arizona, July 8–20, 1916; male, Empire Mountains, Arizona, July 3, 1924 (A. A. Nichol); 2 males, Fort Grant, Pinaleno Mountains, Arizona, July 18, 1917; 2 males, Steins, Grant County, New Mexico, July 14, 1917 (J. Bequaert); male, Fort Grant, Pinaleno Mountains, Arizona, July 19, 1917; 2 males, Texas Pass, Arizona, July 19, 1917; male, Texas Pass, Arizona, July 20, 1917; male, southern Arizona. Paratypes in collections of University of Minnesota, United States National Museum, American Museum of Natural History, Cornell University, University of Kansas, J. Bequaert, and the author.

The median area of fine punctures on the second sternite distinguishes *atrifulva* from species of a similar appearance.

133. DASYMUTILLA OCYDROME, new species

Male.—Head and thorax black, the abdomen ferruginous, except the first segment, the second sternite and the basal third of the second tergite blackish; front, vertex, dorsum of thorax, abdomen above from base of tergite 2, and apical fringes of sternites 2–6, clothed with fulvous pubescence; second sternite with a median area of fine, close punctures, each of the latter bearing a fine hair; length, 11 mm.

Head entirely black; front and vertex clothed with long, sparse, erect, fulvous pubescence; remainder of the head clothed with similar black pubescence; mandibles acute at the apex, bidentate subapically within; anterior margin of clypeus distinctly bidentate medially; clypeus densely punctate; scape bicarinate beneath, densely punctate, clothed with sparse, coarse, black hairs; first segment of flagellum subequal in length to the second; antennal scrobes strongly carinate above; front coarsely, confluently punctate; vertex with large, contiguous punctures, not as coarsely sculptured as the front; genae with moderate, shallow punctures; relative widths of head and thorax, 6.25–6.75.

Thorax black; pronotum, mesonotum and anterior margin of scutellum clothed with long, somewhat appressed, fulvous pubescence, most dense on the mesonotum; cephalic face of pronotum punctate laterally, glabrous, impunctate medially, the medial area very weakly emarginate, if at all, almost evenly rounded into the dorsum; pronotum, mesonotum, and scutellum very coarsely, deeply, confluently punctate; narrow basal and lateral margins of tegulae setigerously punctate, the tegulae for the most part glabrous, impunctate; propleura with large, close punctures marginally, fine punctures medially; anterior third of mesopleura with moderate, separated punctures, the posterior two-thirds with very large, deep, contiguous punctures; metapleura glabrous, impunctate, except for a few large punctures ventrally; sides of propodeum coarsely, shallowly, foveately reticulate; posterior face and dorsum of propodeum coarsely, deeply, foveately reticulate.

Abdomen ferruginous, except the first segment, the second sternite and the basal third of the second tergite dark mahogany red, almost black; apical two-thirds of second tergite, tergites 2–7, and apical fringes of all the sternites, clothed with long, erect, fulvous pubescence; first segment nodose, sparsely punctured anteriorly, coarsely, confluently punctured posteriorly, the apical margin with dense, small punctures; second tergite with moderate contiguous punctures laterally at the base and on the broad apical margin, the remainder of the tergite with the punctures distinct and well-separated; tergites 2–6 with small, dense punctures; narrow basal area of ultimate tergite punctate and pubescent, the pygidial area, longitudinally rugose and without an apical fringe of hairs, occupying the remainder of the tergite; carina of first sternite prominent, produced posteriorly to form a tooth, the sternite with large, scattered punctures; second sternite with large, distinct punctures, sparser medially, and wih a median area of dense, fine punctures, each of the latter bearing a fine hair; apical margins of sternites 2–6 with small, scattered punctures; ultimate sternite punctate and pubescent.

Legs black, clothed with long, sparse, black pubescence; calcaria black.

Wings dark fuliginous; cell 2nd R_1+R_2 broadly truncate at the apex; cell R_4 almost obsolete; vein M_{3+4} received by cell R_5 at a little less than one-third the distance from the base to the apex; veins r–m and R_5 approximate, almost touching, on vein r.

Holotype.—Male, Cat. No. 40754, U.S.N.M., Phoenix, Arizona, July 25, 1917 (W. D. Pierce).

Paratypes.—Male, Phoenix, Arizona, August 3, 1917; male, Tempe, Arizona, August 5, 1917; male, Florence, Pinal County, Arizona, August 28, 1917; male, Sacaton, Arizona, July 26, 1924 (J. A. Harris, jr.); male, Tucson, Arizona, July 12, 1924 (A. A. Nichol); male, Empire, Arizona, July 3, 1924 (A. A. Nichol); 4 males, Baboquivaria Mountains, Arizona (F. H. Snow), in collections of the University of Kansas, University of Minnesota, Cornell University, J. Bequaert, and the author.

Closely related and similar to *atrifulva.* Readily distinguished from the latter species by the yellow to red pubescence on the head and thorax. The pubescence of the paratypes varies from yellow to red. The length of the paratypes varies from 10–12 mm. The genitalia are identical with those of *atrifulva* and are therefore not figured.

The following nine species are known only in the male sex and their relationships are obscure. They are grouped here only for convenience. All of them have the second abdominal sternite without a median pit densely filled with erect hairs.

134. DASYMUTILLA ABDITA, new species

Plate 5, fig. 38

Mutilla testaceiventris Fox, Trans. Amer. Ent. Soc., vol. 25, p. 242, 1899, male (part).

Male.—Black, clothed above with reddish-orange pubescence; antennal scrobes distinctly carinate above; first segment of flagellum three-fourths the length of the second; anterior margin of pronotum emarginate medially; pygidium without an apical fringe of hairs;

second abdominal sternite convex, without a median pit or a row of hairs simulating a carina. Length, 11.5 mm.

Head black, clothed with long, erect, black pubescence, except that on the vertex and posterior part of the front orange; clypeus bidentate medially on the apical margin, the disk with moderate, shallow confluent punctures; scape bicarinate beneath, coarsely punctured and clothed with long, black hairs; first segment of the flagellum three-fourths the length of the second; antennal scrobes distinctly carinate above; front very coarsely rugoso-punctate; vertex coarsely confluently punctate; genae with moderate, close punctures, the latter smaller than those of the front and vertex; eyes large, very prominent; vertex gibbose behind the ocelli, much more prominent than the lateral portions; relative widths of head and thorax, 6–7.5.

Thorax black; the pronotum, mesonotum, scutellum, and metanotum clothed with long, erect, orange pubescence, the remainder of the thorax clothed with long, erect black pubescence; anterior margin of the pronotum emarginate medially, the cephalic surface of the emargination glabrous, impunctate; pronotum, mesonotum, and scutellum very coarsely and closely punctured; propleura with moderate, close punctures, smaller and more separated along the caudal margin; anterior half of mesopleura with large, separated punctures, the posterior half with the punctures very close and more or less confluent; ventral half of metapleura with large and close punctures at the ventral margin, becoming smaller and separated dorsally, the dorsal half of metapleura glabrous, impunctate; anterior half of sides of propodeum with large, more or less separated punctures, the posterior half irregularly foveolate; dorsal and posterior faces of propodeum irregularly foveolate; tegulae glabrous, impunctate except the basal and inner lateral margins with small, separated punctures.

Abdomen black; first tergite coarsely and rugosely punctured, except the punctures at the apical margin small and close, clothed with long, erect, black pubescence; second tergite with moderate, deep, slightly elongate punctures, separated on the disk, close and more or less confluent laterally, the basal third clothed with long, erect, black pubescence; the apical two-thirds clothed with long, erect orange pubescence; tergites 3–6 with close, moderate punctures, clothed with long, erect, orange pubescence; last tergite convex, the lateral and apical margins reflexed, the disk delicately reticulated, basal fourth clothed with long, erect, orange pubescence, the apical three-fourths bare; first sternite with a prominent median longitudinal carina, with large, close punctures, and clothed with long, erect, black pubescence; second sternite with large, elongate, separated, and confluent punctures, clothed with sparse, long, erect, black pubescence, the apical fringe black except extreme lateral portions orange; sternites 3–6 with small, scattered punctures, the apical fringes of sternites 3–5 black with a few orange hairs at the lateral extremes, the apical fringe of sternite 6 entirely black; last sternite with scattered punctures and sparse, long, black pubescence.

Legs very dark mahogany red, almost black, clothed with long, erect, moderately dense, black hairs; calcaria black.

Wings dark fuliginous; cell 2nd R_1+R_2 broadly truncate at the apex; cell R_4 almost obsolete; vein M_{3+4} received by cell R_5 midway between the base and apex; veins r–m and R_5 coalescing on vein r.

Holotype.—Male, Cat. No. 40755, U.S.N.M., Los Angeles County, California.

Paratypes.—Male, La Jolla, San Diego County, California, August 19, 1917 (H. Klotz); 2 males, Bear Valley, San Bernardino County, California, July, 1913 (F. C. Clark); male, San Bernardino County, California; male, Los Angeles, California, May 27, 1917; 7 males, Los Angeles County, California; 3 males, Claremont (Baker); 2 males, mountains near Claremont (Baker); male, Santa Paula (Essig); male, Los Gatos Canyon, Fresno County, June 6–8, 1907 (J. C. Bradley); male, Coalinga, Fresno County, June 9, 1907 (J. C. Bradley); male, Palo Alto, California, July 27, 1894; male, Berkeley (E. P. Van Duzee); male, Point Reyes, September 10, 1906; male, Del Norte County, August, 1916; 4 males, California; male, Corvallis, Oregon, July 28, 1925 (H. A. Scullen); male, Corvallis, Oregon, July 29, 1925 (G. R. McGinnis); male, Corvallis, Oregon, August 4, 1925 (H. A. Scullen); male, Corvallis, Oregon, August 6, 1924 (H. A. Scullen); male, Crater Lake, Oregon, August 2 (W. J. Chamberlain); male, Osoyoos, British Columbia; 2 males, Okanaga Valley, British Columbia; male, Okanaga, British Columbia, August, in collections of United States National Museum, Harrington collection, Canadian Department of Agriculture, Leland Stanford Jr. University, University of Minnesota, Cornell University, Iowa State College, Oregon State Agricultural College, California State Insectary, and the author.

Superficially this species is indistinguishable from the males of *coccineohirta.* The genitalia, however, as may be seen in the illustrations, are very different. The two species may be distinguished most easily by the character used in the key, that of the comparative lengths of the first two segments of the flagellum; other differences are present, but are very subtle and difficult to recognize; in *coccineohirta* the area immediately posterior of the bidentation on the medial apical margin of the clypeus is glabrous and impunctate, while in *abdita* it is punctate; the body is in general more coarsely sculptured in the latter than in *coccineohirta.*

There is considerable variation in size and color of pubescence. The length of the paratypes varies from 8 to 13 mm., while the color of the pubescence varies between scarlet and yellow. In most of the paratypes the black pubescence of the second tergite covers only the basal third of the tergite, but in two or three specimens the black pubescence covers at least the basal two-thirds of the tergite.

This species has been compared with the type of *testaceiventris* and is not that species. However, a specimen in the United States National Museum designated as a cotype of *testaceiventris* is identical with *abdita*.

135. DASYMUTILLA CANDIDA, new species

Plate 5, fig. 39

Male.—Dark mahogany red; front, vertex, thorax above and abdominal segments from apex of segment two with very pale yellowish pubescence; length, 9 mm.

Head very dark mahogany red; mandibles acuminate at the apex, bidentate within at a point one-third their length from the apex; clypeus feebly bidentate at the apical margin; first segment of flagellum slightly shorter than the second; antennal scrobes not carinate above; eyes and ocelli of normal size; front closely, confluently punctate; vertex and genae with shallow, indistinct punctures; front and vertex with sparse, erect, very pale yellowish pubescence; relative widths of head and thorax, 5.25–6.

Thorax dark mahogany red; pronotum, mesonotum, and scutellum with large, more or less confluent punctures, those on the scutellum larger and deeper than those of the pro- and mesonotum; the pronotum, mesonotum, scutellum, and metanotum clothed with long, erect, very pale yellowish pubescense; propleura indistinctly punctured, sparsely clothed with dark pubescence; mesopleura with large shallow punctures, the latter confluent in the medial area, sparsely clothed with dark pubescence; metapleura glabrous, impunctate except for a very few scattered punctures ventrally, very sparsely clothed with dark pubescence; propodeum broadly reticulate throughout, the reticulations more shallow and less distinct on the sides than on the posterior face and dorsum; tegulae glabrous, with a few scattered punctures and sparse pale pubescence along the basal and inner lateral margins.

Abdomen very dark mahogany red, the second tergite paler than the other sclerites; first segment distinctly nodose; first tergite with large, coarse deep punctures on the disk, and small, confluent punctures along the apical margin; second tergite with moderate, confluent punctures throughout, the punctures coarser at the base and sides, clothed with sparse, erect, black pubescence and an apical fringe of long, pale yellowish pubescence; tergites 3–6 with small more or less separated punctures, clothed with rather sparse, erect, very pale yellowish pubescence; apical tergite with a fringe of pale yellowish pubescence at the base, indistinctly rugose; first sternite with a prominent median carina, the latter somewhat dentiform posteriorly; second sternite with large, elongate punctures at the sides, very small sparse punctures medially; sternite 3–6 with small, confluent punctures along the apical margins; sternites 2–5 with a thin apical fringe of pale yellowish pubescence.

Legs mahogany red, clothed with brownish pubescence.

Wings fuliginous; cell R_4 present, but indistinct.

Holotype.—Male, San Bernardino Ranch, Douglas, Arizona (F. H. Snow), in collection of University of Kansas.

Superficially this species resembles *subhyalina* very much, the distribution of pale pubescence being almost the same in the two species. However, it lacks the large eyes and ocelli, and the subhyaline wings of *subhyalina*, and obviously is not closely related to that species.

It is difficult to determine whether the yellowish cast of the pubescence is natural or whether it is due to staining during the collecting process. It is possible that in nature the pale pubescence is pure white.

136. DASYMUTILLA DORIPPA, new species

Plate 5, fig. 37

Male.—Black; clothed with black pubescence, except vertex, dorsum of thorax and abdomen above from and including apical half of second tergite clothed with yellow pubescence; ocelli very large and conspicuous, but eyes of normal size; last tergite with an apical fringe of erect hairs; second sternite without a median pit or row of hairs simulating a carina. Length, 13 mm.

Head black, clothed with black pubescence, except the front and vertex clothed with sparse, erect, yellowish pubescence; mandibles acute at the apex, bidentate within near the apex; clypeus bidentate medially on the apical margin; disk of clypeus densely, finely punctate; scape bicarinate beneath, densely punctate above; first segment of flagellum subequal in length to the second; antennal scrobes distinctly carinate above; front densely, confluently punctate; vertex and genae closely, more or less confluently punctate; ocelli very large and conspicuous, the median ocellus larger than the lateral ocelli and separated from the latter by about its own diameter; relative widths of head and thorax, 8–10.25.

Thorax black, clothed with long, erect, black pubescence, except the pronotum, mesonotum, scutellum and postscutellum clothed with long, erect, yellow pubescence; propodeum with black pubescence very long and conspicuous; pronotum weakly emarginate medially, the cephalic face of the emargination glabrous, impunctate; remainder of cephalic face of pronotum punctate and pubescent; pronotum, mesonotum, and scutellum with large, dense, confluent punctures; posterior margin of pronotum immediately anterior to the tegulae defined by a carina; dorsal and anterior areas of propleura punctured like the pronotum, the posterior portion indistinctly sculptured with intermixed moderate and fine punctures; mesopleura with large, deep, confluent punctures medially, the punctures becoming sparse and smaller both posteriorly and anteriorly; ventral half of metapleura coarsely, confluently punctate, the dorsal half glabrous, impunctate; sides of propodeum coarsely, foveately reticulate, except towards the anterior margin the sculpture less coarse and deep; posterior face and dorsum of propodeum very coarsely, deeply and foveately reticulate; tegulae dark ferruginous, the basal half setigerously punctate, the apical half glabrous, impunctate, the pubescence on the basal half yellow.

Abdomen black, clothed with black pubescence, except apical half of second tergite, tergites 3–6, and base of last tergite clothed with long, erect, yellow pubescence; first tergite densely, confluently punctate; basal half of second tergite (that is area with black pubescence) densely, confluently punctate, the punctures of moderate size, the apical half with distinct, separated punctures; tergites 3–6 with small, close punctures; last tergite with an apical fringe of erect hairs at the apical margin, the pygidial area glabrous; first sternite punctate and with a median longitudinal carina; second sternite with large, deep punctures, the latter sparse medially, close and dense laterally and basally; second sternite without a median pit or row of hairs simulating a carina; sternites 3–6 with scattered punctures near their apical margins; basal two-thirds of last sternite punctate; sternites 2–6 with black apical fringes.

Legs black, clothed with long, black pubescence; calcaria black.

Wings dark fuliginous; cell 2nd R_1+R_2 squarely truncate at the apex; cell R_4 indistinct; vein M_{3+4} received by cell R_5 about one-third the distance from the base to the apex; veins r–m and R_5 coalescing on vein r.

Holotype.—Male, Ormsby county, Nevada, July (Baker), in collection of Cornell University.

This is very much like *coccineohirta* Blake, especially in color and general sculpture. It differs from the latter in the large, conspicuous ocelli, and in having an apical fringe of hairs on the last tergite. The genitalia are also dissimilar as will be seen by a comparison of the figures.

137. DASYMUTILLA GLYCERA, new species

Plate 5, fig. 40

Male.—Black, clothed with black pubescence, except the head above, dorsum of thorax, abdomen above, and apical fringes of abdominal sternites in part, yellow; cephalic margin of pronotum not emarginate; last abdominal tergite with an apical fringe of erect hairs; second abdominal sternite without a median pit or longitudinal row of hairs simulating a carina. Length, 9.5 mm.

Head black, clothed with sparse, black erect pubescence, except the front and vertex clothed with sparse, long, erect, yellow pubescence; mandibles acute at the apex, bidentate within near the apex; apical margin of clypeus bidentate medially; disk of clypeus densely, confluently punctate; scape weakly bicarinate beneath, coarsely, closely punctate; first segment of flagellum suequal in length to the second, especially when measured beneath; antennal scrobes weakly carinate above; front with large, dense, confluent punctures; vertex with large, mostly separated but somewhat confluent punctures; relative widths of head and thorax, 5.75–6.

Thorax black, clothed with long, sparse, erect, black pubescence, except the pronotum, mesonotum, scutellum, and postscutellum with long, somewhat dense, erect, yellow pubescence; cephalic margin of pronotum not at all emarginate medially; pronotum, mesonotum, and scutellum with large, dense confluent punctures; propleura with large, close punctures and a small area of fine punctures near the posterior margin; mesopleura with coarse punctures, dense and confluent medially, separated at the anterior and posterior margins; metapleura glabrous, impunctate except for scattered punctures ventrally; anterior margin of sides of propodeum glabrous, impunctate, the posterior half coarsely, foveately reticulate; posterior face and dorsum of propodeum deeply and very coarsely, foveately reticulate; tegulae glabrous and impunctate, except the basal and inner lateral fourths setigerously punctate, the pubescence yellow.

Abdomen black, clothed with sparse, black, erect pubescence, except the apical half of the second tergite, tergites 3–6, base of last tergite, clothed with long, somewhat dense, erect, yellow pubescence; apical fringes of first tergite medially, sternites 2–3, and sternites 4 and 5 laterally, yellow; first tergite coarsely, confluently punctate; second tergite with large, deep punctures separated medially, dense and somewhat confluent basally and laterally; tergite 3–6 densely confluently punctate; pygidial area longitudinally rugose, with an apical fringe of short, erect hairs; first sternite deeply punctate and with a median longitudinal carina; second sternite with large, deep punctures, sparse medially, somewhat dense basally and laterally, without a median pit filled with hairs, or a longitudinal row of hairs simulating a carina; sternites 3–6 with scattered punctures near the apical margins; basal two-thirds of last sternite punctate.

Legs black, sparsely clothed with long, black pubescence; calcaria black.

Wings dark fuliginous; cell 2nd R_1+R_2 broadly truncate; cell R_4 indistinct; vein M_{3+4} received by cell R_5 about one-third the distance from the base to apex; veins r–m and R_5 widely separated on vein r.

Holotype.—Male, Florence, Arizona, June 24, 1903, in collection of American Entomological Society of Philadelphia.

Paratype.—Male, Florence, Arizona (C. R. Biederman), in collection of University of Minnesota.

Glycera is quite distinct from other species of a similar appearance by the absence of a median pit or other modification of the second sternite, the presence of an apical fringe on the last tergite, the cephalic margin of the pronotum not at all emarginate, and the antennal scrobes carinate above. The paratype is 7 mm. in length.

138. DASYMUTILLA PERILLA, new species

Plate 5, fig. 41

Male.—Dark mahogany red, clothed with long, black, erect pubescence, except the apical half of second abdominal tergite and tergites 3–6 clothed with yellowish pubescence; antennal scrobes not at all carinate above; second sternite without a median pit; ultimate tergite with an apical fringe of short, erect, black hairs; length, 9 mm.

Head dark mahogany red, clothed throughout with sparse, long, erect, black pubescence; mandibles acute at the apex, bidentate subapically within; clypeus bidentate medially at the anterior margin, the disk confluently punctate; scape coarsely punctate, faintly bicarinate beneath; first segment of flagellum equal in length to the second, measured ventrally, slightly shorter than the second, measured dorsally; antennal scrobes not at all carinate above; front and vertex coarsely, confluently punctate, the genae moderately, distinctly punctate; relative widths of head and thorax, 4.75–5.75.

Thorax dark mahogany red, clothed throughout with sparse, long, black, erect pubescence; anterior face of pronotum punctate, evenly rounded into the dorsum of pronotum, not emarginate medially; pronotum, mesonotum, and scutellum very coarsely, confluently punctate; propleura coarsely, closely punctate; mesopleura coarsely, closely punctate; metapleura glabrous, impunctate, except for a few scattered punctures at the ventral margin; anterior margin of sides of propodeum glabrous, impunctate, remainder very coarsely foveolate; posterior face and dorsum of propodeum very closely foveolate; tegulae setigerously punctate basally and laterally, otherwise glabrous, impunctate.

Abdomen dark mahogany red; first tergite, basal half of second tergite, and all the sternites clothed with sparse, long, erect, black pubescence; apical half of second tergite, tergites 3–6, and basal portion of ultimate tergite clothed with long, somewhat dense, erect, yellowish pubescence; first tergite coarsely, densely punctate throughout; second tergite closely, for the most part distinctly, punctate, the punctures large and elongate; tergites 3–6 closely, moderately punctate; pygidium somewhat longitudinally rugose; apical margin of ultimate tergite with a fringe of short, erect, black hairs; first sternite with a median longitudinal carina, coarsely punctate; second sternite with large, elongate punctures, sparse medially, close laterally; apical margin of sternites 3–6 finely punctate; ultimate sternite moderately, closely punctate throughout.

Legs dark mahogany red, sparsely clothed with long, black hairs; calcaria dark.

Wings dark fuliginous; cell 2nd R_1+R_2 broadly truncate at the apex; cell R_4 almost obsolete; vein M_{3+4} received by cell R_5 at one-third the distance from the base to the apex of the latter; veins r–m and R_5 separated on vein r.

Holotype.—Male, Cat. No. 40756, U.S.N.M., Texas.

Paratype.—Male, Anhalt, Comal County, Texas, June 28, 1917, in collection of Cornell University.

139. DASYMUTILLA PERILLA var. GENTILICIA, new variety

Male.—Like *perilla*, except the vertex and dorsum of thorax clothed with yellowish pubescence.

Holotype.—Male, Wallace County, Kansas, July 8, in collection of Kansas State Agricultural College.

Paratypes.—Male, La Junta, Colorado, July 22–23, 1919 (Rehn and Hebard), in collection of American Entomological Society of Philadelphia; male, without data, in collection of University of Minnesota.

With the exception of the color of the pubescence on the vertex and on the dorsum of the thorax, this variety is identical with *perilla*. The genitalia are alike in both.

140. DASYMUTILLA PHAON (Fox)

Plate 5, fig. 42

Mutilla phaon Fox, Trans. Amer. Ent. Soc., vol. 25, p. 243, 1899, male.

Mutilla gorgon Fox, Trans. Amer. Ent. Soc., vol. 25, p. 248, 1899, male (not female).

Ephuta (Ephuta) phaon André, Gen. Ins., vol. 1, fasc. 11, p. 62, 1903, male.

Type.—Male, Arizona, in collection of American Entomological Society of Philadelphia. The specimen described by Fox as the male of *gorgon* is in collection of the American Entomological Society of Philadelphia; the figure of the genitalia was made from this specimen.

Distribution.—Arizona, New Mexico.

SPECIMENS EXAMINED

ARIZONA: Male, Oracle, June 12, 1903 (Oslar); male, Catalina Mountains, June 13, 1903 (Oslar); male, Prescott, June 11, 1902 (Oslar); male, Fort Grant, Pinaleno Mountains, July 17, 1917.

I have examined the type of *phaon* Fox and compared it with the male of *gorgon* Fox, and find them to be the same. The specimens listed above have also been compared with the type of *phaon.* The species may be recognized by the shallow, indistinct puncturation of the head, the antennal scrobes distinctly carinate above, second abdominal sternite without a median pit, and ultimate tergite with an apical fringe of hairs. In typical *phaon* the thorax is entirely black pubescent.

141. DASYMUTILLA PHAON var. FIMBRIALIS, new variety

Male.—Similar to *phaon* Fox, with the exception that the dorsum of the thorax is clothed with red pubescence.

Holotype.—Male. Cat. No. 40757, U.S.N.M., Utah.

Paratypes.—Male, Utah; 3 males, Oracle, Arizona, June 9, 1903 (Oslar); male, Oracle, Arizona, June 11, 1903 (Oslar); 3 males, Oracle, Arizona, June 12, 1903 (Oslar); 6 males, Catalina Mountains, Arizona, June 13, 1903 (Oslar); 3 males, Catalina Mountains, Arizona, June 14, 1903 (Oslar); male, Tucson, Arizona, May 16, 1903 (Oslar); 3 males, Tucson, Arizona, June 3, 1903 (Oslar); 2 males, Tucson, Arizona, June 6, 1903 (Oslar); male, Palm Springs, California, March 23–25, 1918 (J. C. Bradley); in collections of United States National Museum, American Entomological Society of Philadelphia, Cornell University, University of Minnesota, and the author.

The amount of red pubescence on the thorax varies from a very little on the posterior portion of the mesonotum and the scutellum, to the mesonotum and scutellum entirely clothed with reddish pubescence; the color of the pubescence varies from scarlet to yellowish red.

142. DASYMUTILLA TESTACEIVENTRIS (Fox)

Plate 5, fig. 43

Mutilla testaceiventris Fox, Trans. Amer. Ent. Soc., vol. 25, p. 242, 1899, male.

Ephuta (*Ephuta*) *testaceiventris* ANDRÉ, Gen. Ins., vol. 1, fasc. 11, p. 64, 1903, male.

Type.—Male, Poway, California, in collection of Entomological Society of Philadelphia.

Plesiotype.—Male, Orange County, California, collection of University of Minnesota.

Distribution.—California and Oregon.

SPECIMENS EXAMINED

CALIFORNIA: Male, La Jolla, San Diego County, August 26, 1917 (H. Klotz); male, Laguna Beach, July 8, 1916; male, Orange County; female, Saugus, Los Angeles County, August 18, 1917; male, Santa Paula (Essig); male, Sonoma County, July, 1908.

OREGON: Male, Corvallis, August 27, 1925 (D. A. Wilbur).

This species resembles *coccineohirta* and *abdita* to such an extent that it is only distinguished by a close examination. It may be separated from both by the absence of a medial emargination on the anterior margin of the prothorax and by the depressed character of the second sternite. The genitalia of *testaceiventris* are also very different from the above-mentioned species. The venter of all the specimens at hand is darker than that described by Fox, and the ground color of the tergites of the abdomen is very dark red in some specimens. The length of the specimens examined varies from 6 to 12 mm. The pubescence of all the specimens is black and scarlet. There may, however, be a variation in color from scarlet to yellow in nature, similar to the variation found in *coccineohirta*, *abdita*, and other species, but there is no evidence of such a variation in the specimens available for examination.

PART 4

ANNOTATED BIBLIOGRAPHY

The only general bibliography of the Mutillidae heretofore published is that by André (1910). So many additions and corrections have been made during the course of the present study that it seems wise to present a revised bibliography of the subject at this time. With a few exceptions, which are noted, I have been able to examine all of the original papers. This has given me an opportunity to make notes regarding the contents of each paper which have proved of considerable help from time to time. These notes ought to prove of some assistance to future workers and I am therefore including them and presenting an annotated bibliography. In order to conserve space I have classified the material contained in the papers into eleven classes and assigned each class a number as follows: 1. Paper not seen by me; 2. Important monographic work; 3. New genera described; 4. New species described; 5. Data regarding biology; 6. Key to genera; 7. Key to species; 8. General textbook account; 9. Faunal list; 10. Data on synonymy; 11. Bibliography; and 12. Discussion of classification and phylogeny. Numbers in parenthesis at the conclusion of each entry in the bibliography refer to the foregoing and indicate the type of material presented in the paper cited. It should be kept in mind, however, that entries designated with the number "2," indicating that such entry is an important monographic work, may contain material described under any or all of the foregoing classes.

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EXPLANATION OF PLATES

All drawings to the same scale and made by the author

PLATE 1

Fig. 1. *Dasymutilla asopus* (Cresson). Male genitalia.
2. *Dasymutilla fulvohirta* (Cresson). Male genitalia.
3. *Dasymutilla eminentia*, new species. Male genitalia.
4. *Dasymutilla phoenix* (Fox). Male genitalia.
5. *Dasymutilla sparsa* (Fox). Male genitalia.
6. *Dasymutilla medora*, new species. Male genitalia.
7. *Dasymutilla macra* (Cresson). Male genitalia.
8. *Dasymutilla vesta* (Cresson). Male genitalia.
9. *Dasymutilla zelaya* (Blake). Male genitalia.

PLATE 2

Fig. 10. *Dasymutilla rubricosa*, new species. Male genitalia.
11. *Dasymutilla coccineohirta* (Blake). Male genitalia.
12. *Dasymutilla lepeletierii* (Fox). Male genitalia.
13. *Dasymutilla castor* (Blake). Male genitalia.
14. *Dasymutilla gentilis*, new species. Male genitalia.
15. *Dasymutilla hora*, new species. Male genitalia.
16. *Dasymutilla permista* (Mickel). Male genitalia.

PLATE 3

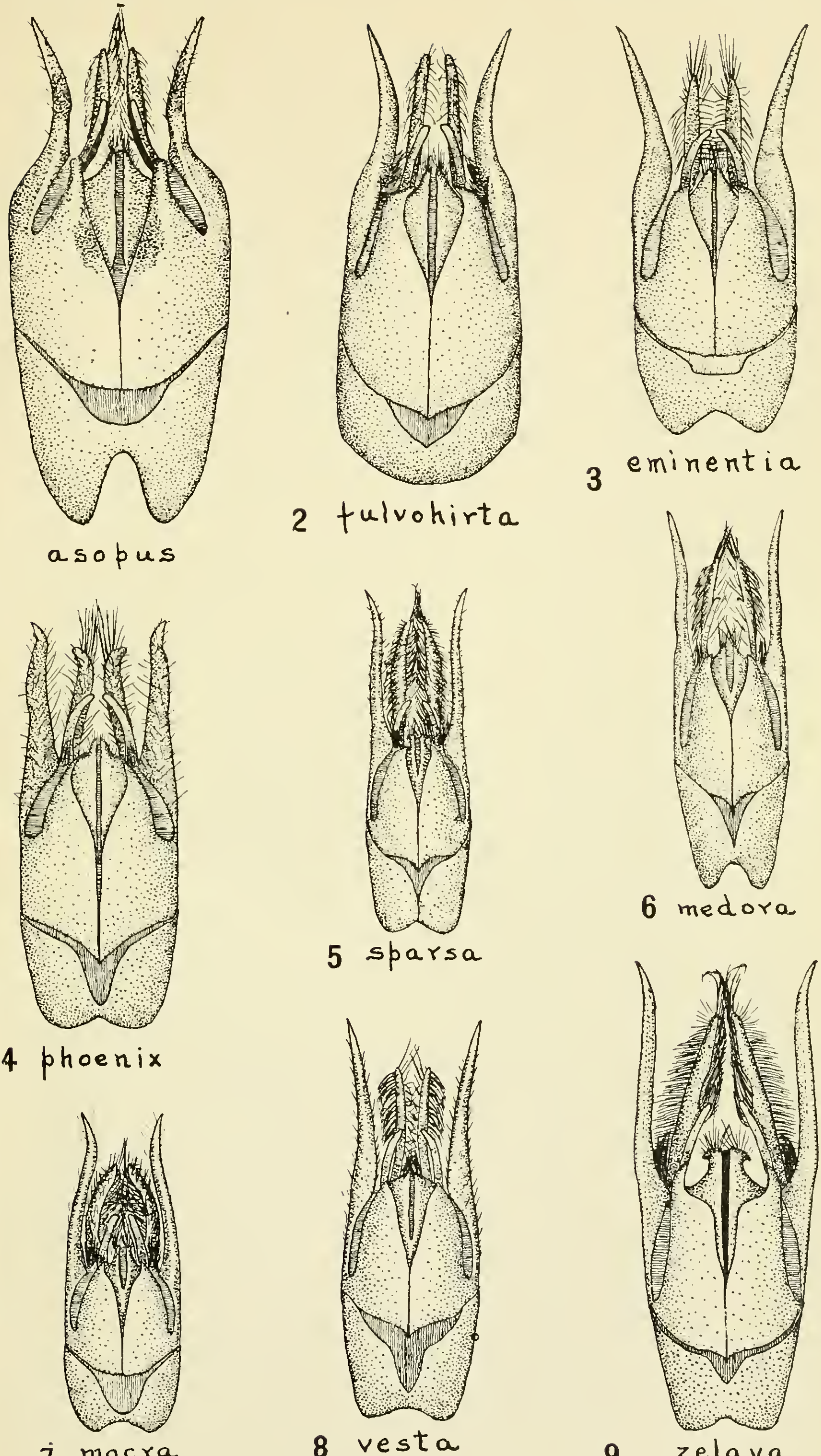
Fig. 17. *Dasymutilla macilenta* (Blake). Male genitalia.
18. *Dasymutilla gibbosa* (Say). Male genitalia.
19. *Dasymutilla meracula*, new species. Male genitalia.
20. *Dasymutilla sackenii* (Cresson). Male genitalia.
21. *Dasymutilla monticola* (Cresson). Male genitalia.
22. *Dasymutilla reclusa*, new species. Male genitalia.
23. *Dasymutilla occidentalis* (Linnaeus). Male genitalia.
24. *Dasymutilla magnifica*, new species. Male genitalia.
25. *Dasymutilla scitula*, new species. Male genitalia.

PLATE 4

Fig. 26. *Dasymutilla mimula*, new species. Male genitalia.
27. *Dasymutilla intermixta*, new species. Male genitalia.
28. *Dasymutilla aureola* (Cresson). Male genitalia.
29. *Dasymutilla poliothrix*, new species. Male genitalia.
30. *Dasymutilla obscura* (Blake). Male genitalia.
31. *Dasymutilla subhyalina*, new species. Male genitalia.
32. *Dasymutilla chisos*, new species. Male genitalia.
33. *Dasymutilla creon* (Blake). Male genitalia.
34. *Dasymutilla reperticia*, new species. Male genitalia.
35. *Dasymutilla serenitas*, new species. Male genitalia.

Plate 5

Fig. 36. *Dasymutilla atrifulva*, new species. Male genitalia.
37. *Dasymutilla dorippa*, new species. Male genitalia.
38. *Dasymutilla abdita*, new species. Male genitalia.
39. *Dasymutilla candida*, new species. Male genitalia.
40. *Dasymutilla glycera*, new species. Male genitalia.
41. *Dasymutilla perilla*, new species. Male genitalia.
42. *Dasymutilla phaon* (Fox). Male genitalia.
43. *Dasymutilla testaceiventris* (Fox). Male genitalia.



1 asopus

2 fulvohirta

3 eminentia

4 phoenix

5 sparsa

6 medora

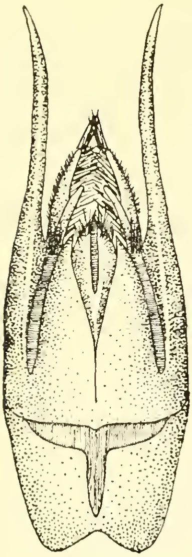
7 macra

8 vesta

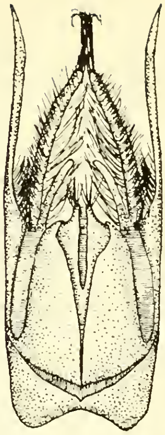
9 zelaya

Male Genitalia of the Dasymutillid Wasps. Dorsal View

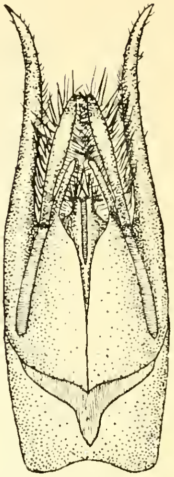
For explanation of plate see page 339



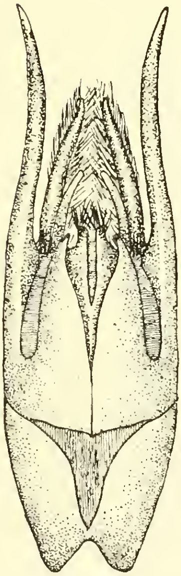
10 rubricosa



11 coccineohirta



12 lepeletierii



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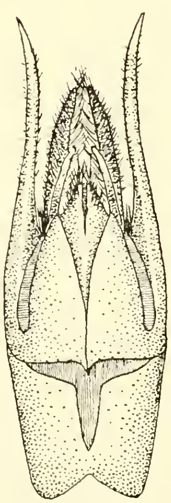
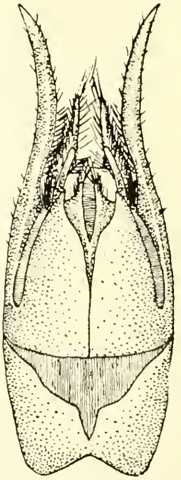
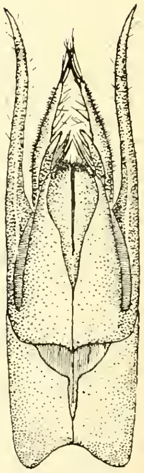


14 gentilis



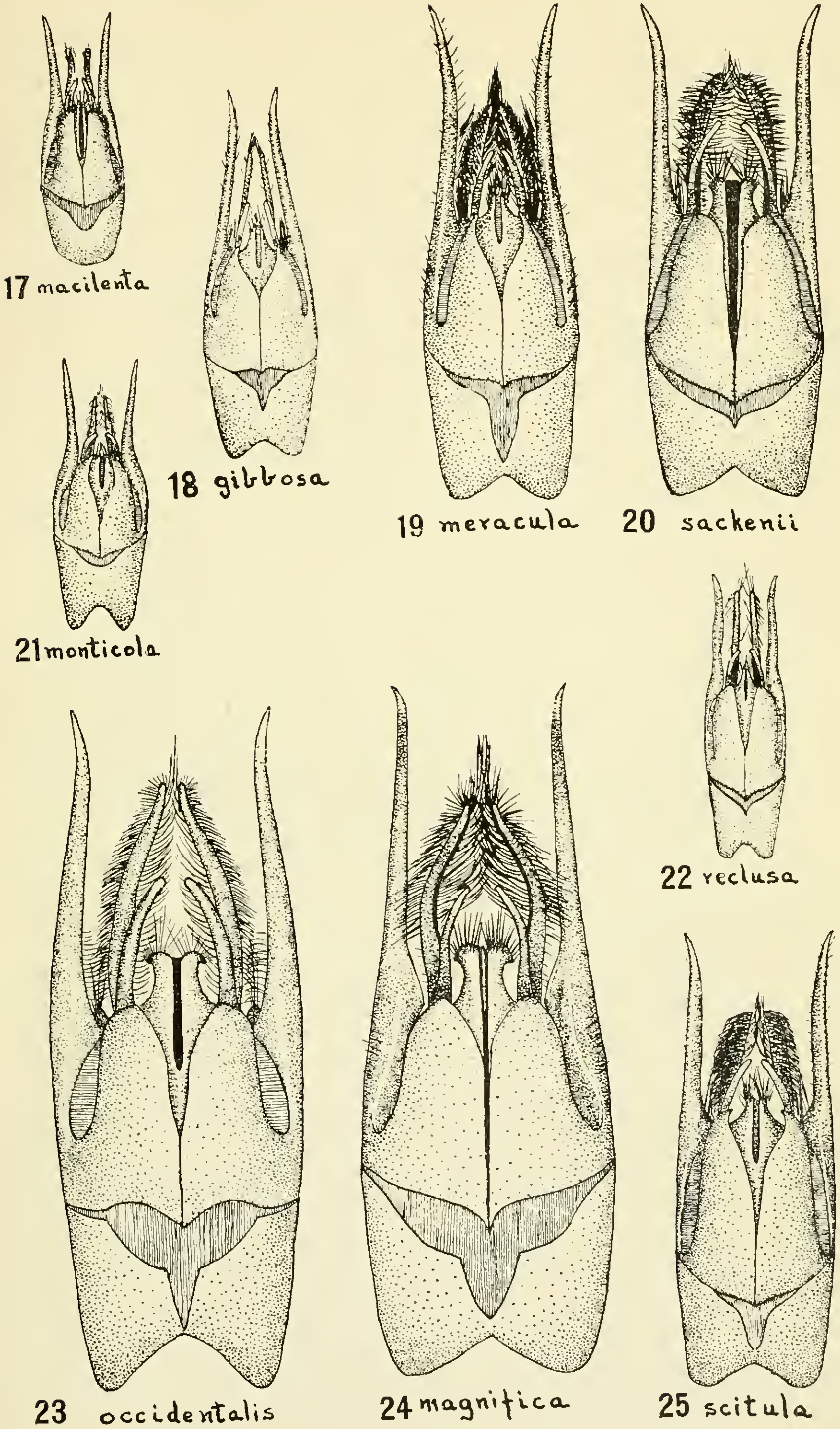
15 hora



16 permista

MALE GENITALIA OF THE DASYMUTILLID WASPS. DORSAL VIEW

FOR EXPLANATION OF PLATE SEE PAGE 339



17 macilenta

18 gibbosa

19 meracula

20 sackenii

21 monticola

22 reclusa

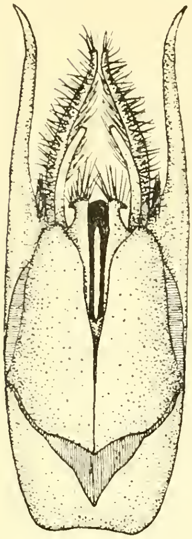
23 occidentalis

24 magnifica

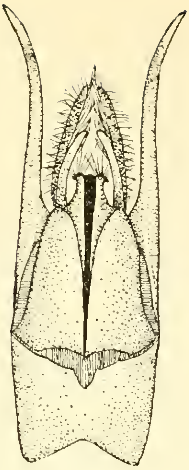
25 scitula

Male Genitalia of the Dasymutillid Wasps. Dorsal View

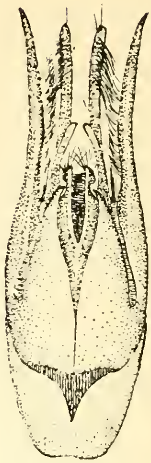
For explanation of plate see page 339



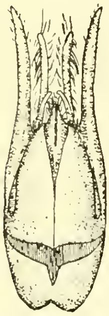
26 mimula



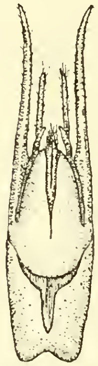
27 intermixta



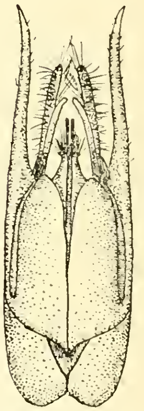
28 aureola



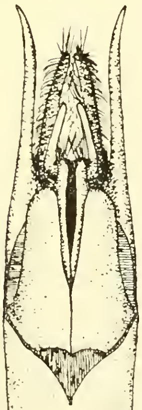
29 poliothrix



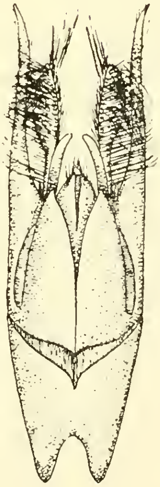
30 obscura



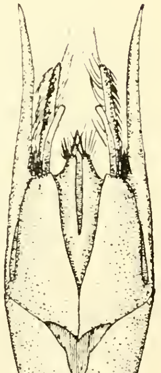
31 subhyalina



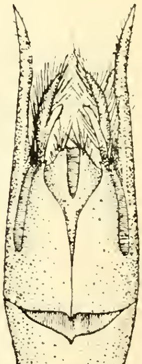
32 chisos



33 creon



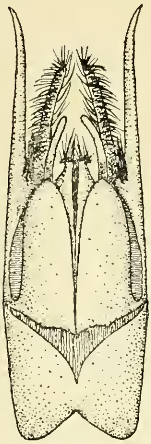
34 reperticia



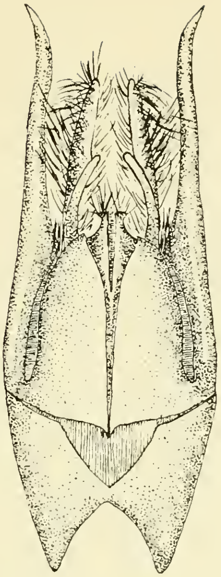
35 serenitas

MALE GENITALIA OF THE DASYMUTILLID WASPS. DORSAL VIEW

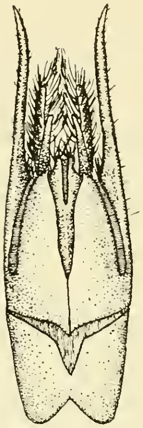
FOR EXPLANATION OF PLATE SEE PAGE 339



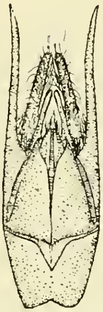
36 atrifulva



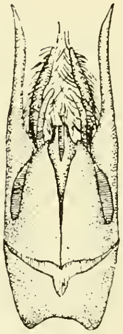
37 dorippa



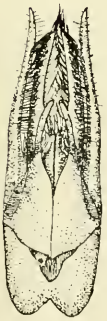
38 abdita



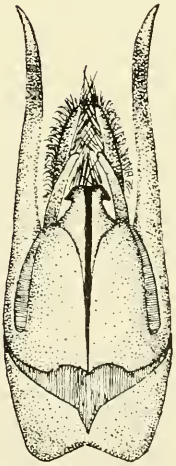
39 candida



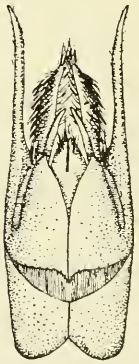
40 glycera



41 perilla



42 phaon



43 testaceiventris

Male Genitalia of the Dasymutillid Wasps. Dorsal View

For explanation of plate see page 340

INDEX

[This index includes all the genera, species, subspecies, and varieties of insects referred to in this paper. The names of insects other than Mutillidae appear in boldface type. All the references are included; in the case of the groups, species, and varieties treated in Part 3, the most important reference appears in boldface type. The generic name associated with species and varietal names is given in brackets. Group names are in small caps, valid names in roman, synonyms in italics.]

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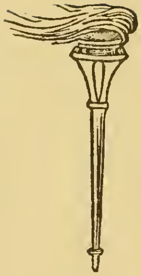

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